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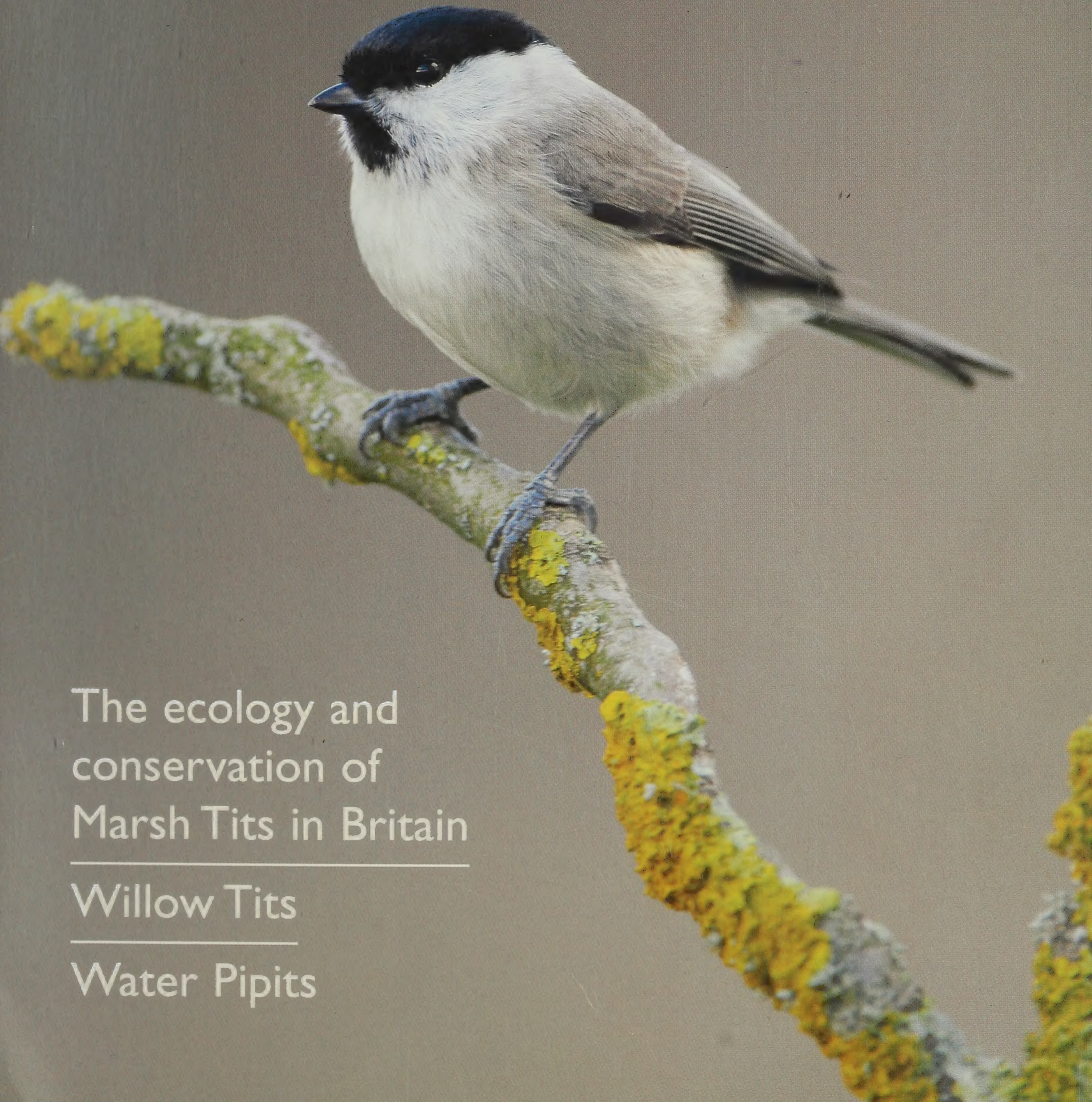

The ecology and conservation of Marsh Tits in Britain

Willow Tits

Water Pipits

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Front-cover photograph: Marsh Tit *Poecile palustris*, Baden-Württemberg, Germany, March 2007.
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Australia's North and South

A dawn mist rises from the mirror-calm surface of Yellow Water Billabong as your launch leaves the wooden dock. The birds are already up and about: skeins of magpie geese and whistling ducks commute in formation overhead; comb-crested jacanas fuss over the lily pads; a jewel-like little kingfisher darts beneath the overhanging pandanus.

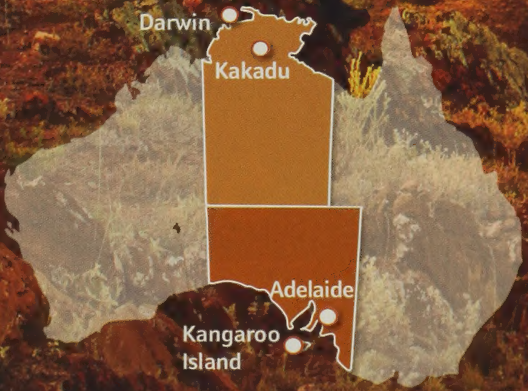
This awakening tropical panorama seems the very picture of serenity. And yet a group of thirsty wallabies hangs back nervously from the water's edge. The reason for their reluctance becomes clear as the serrated back of a saltwater crocodile emerges silently from the deep. This formidable predator – the largest reptile on the planet – stalks the dark waters of **Kakadu National Park** in impressive numbers. Soon see another: a four-metre monster hauled out on a bank, jaws agape with primeval menace.

Some 2,000 km to the south a very different aquatic predator hauls itself out of the churning breakers and shuffles up the beach to join its companions. Australian sea lions are among the most endangered of the world's marine mammals, yet at Seal Bay on **Kangaroo Island** you can stroll on the beach through the very heart of the colony. Sleek youngsters gambol in the surf, while battle-scarred old bulls flop down among the dunes higher up the beach.

There are birds here too, though a very different selection from those of **Kakadu**, with waders, terns and waterfowl finding rich pickings along the fringes of the Southern Ocean. Cape Barren geese overfly the sea lion colony, honking noisily, while rare hooded dotterels scuttle like clockwork along the tideline and a white-bellied sea eagle wheels over the nearby headland.

Kangaroo Island and **Kakadu National Park** are the premier wildlife attractions of South Australia and Northern Territory respectively. So wildly different are their landscapes – the dunes, heathland and mallee scrub of the former contrasting with the tropical wetlands, escarpments and monsoon forest of the latter – that it can be hard to believe they form part of the same country. Yet, together, these two wild destinations embody the extraordinary diversity of Australia's wildlife and offer some of the country's greatest natural spectacles.

The attractions are not only aquatic. Head inland on **Kangaroo Island**, into the eucalypt and mallee scrub, and you will find Australia's native mammals thriving in the absence of invasive predators. Kangaroos abound -



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Rainbow Lorikeets

Koala, Kangaroo Island

Jabiru - Yellow Water Billabong, Kakadu

specifically the western grey kangaroo, which occurs in a unique chocolate-coloured island subspecies – while the rare tammar wallaby flourishes alongside the more common Bennett's wallaby. Look up and you'll find koalas dozing in the gum trees. Down, and you might meet a short-beaked echidna probing the deadwood for termites. At night your torch beam will catch the eye-shine of such elusive nocturnal marsupials as brown bandicoot and brushtail possum.

Flinders Chase National Park is the top spot for many of these animals. But the beauty of **Kangaroo Island** is that you may encounter them anywhere – perhaps crossing a road or foraging around a picnic site. Birds also abound, with nectar-eaters such as purple-gaped honeyeater and eastern spinebill gathering on the flowering eucalypts, rare glossy black-cockatoos roosting in a casuarina grove, and local races of the crimson rosella, grey currawong and western whipbird to excite the birders. Meanwhile keep an eye out at ground level for the 1.3m-long Rosenberg's goanna, the island's largest predator.

Exploring **Kakadu's** interior opens up a world of wildlife adventure. This vast wilderness, protecting an area of nearly 20,000km^2, is more than four times the size of **Kangaroo Island**. Yet as well as boat trips on Yellow Water and the East Alligator River, you can take to the wild terrain on foot – exploring the floodplains and escarpments in search of such strange creatures as frilled lizards – which, when threatened, expand their neck frill like a parasol – and black fruit bats, which flap clumsily around their riverside roosts. Local birds to look out for include the exquisite rainbow pitta and rare chestnut-quilled rock pigeon.

> opens up a world of wildlife adventure

Kakadu's bountiful wildlife is also celebrated in its aboriginal rock art. The park has earned UNESCO World Heritage status for its cultural as well as its natural values, and sacred sites such as Nourlangie have served as a canvas for thousands of years. A trail among the dramatic sandstone escarpments reveals rock faces adorned with creation ancestors and other figures drawn from the human, animal and spiritual worlds. Meanwhile, peregrine falcons soar overhead and the elusive sandstone shrike-thrush whistles its distinctive call from among the cliffs.

On **Kangaroo Island** nature has created its own rock art in the form of Remarkable Rocks, a cluster of wind-carved formations that perch like giant Henry Moore sculptures atop a dome of granite, and the nearby Admiral's Arch, which shelters a New Zealand fur seal colony. These natural monuments both make convenient spots from which to spy the rich marine life offshore, including countless short-tailed shearwaters angling over the waves and – in season – the waving flukes of southern right whales that visit the island's more sheltered bays.

Kakadu and Kangaroo Island in their own way, like nowhere else on earth. Either one offers a truly memorable wildlife experience. To see both is to understand just why Australia – from top to bottom – is a natural wonder like no other.

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The next atlas of European breeding birds, a project that Mark Eaton describes in an extended *BB* eye this month, was something which I have to admit that I was completely unaware of until very recently, and the fact that fieldwork started back in 2013 was a particular surprise. There is a lot to do in the next three years but plenty of exciting birdwatching opportunities as well. The fact that you can now enter records from overseas trips into BirdTrack makes this an easy way to contribute your records, and what better excuse for a trip to an unfamiliar part of Europe in the spring?

Twenty years ago, I would probably have described the three papers in this issue on Marsh and Willow Tits as being about common British breeding birds. But the last atlas of Britain & Ireland's birds, together with annual Breeding Bird Survey data, shows how fast these two species have declined, in both abundance and range, particularly the Willow Tit – in marked contrast to the fortunes of some other members of the tit family. It will be interesting to see the wider European patterns in a few years' time. Understanding more about the ecology of species in trouble is the quickest way to discover the reasons why they are declining, and it is good to see us beginning to explore potential conservation measures for these recently widespread species.

Roger Riddington

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European Breeding Bird Atlas 2

In 1997, the European Bird Census Council (EBBC) published the first atlas of breeding birds in Europe (Hagemeijer & Blair 1997), a groundbreaking book that mapped all of Europe's breeding birds. For nearly 20 years this work has been a powerful tool for conservation, standing as the authority on bird distributions, underpinning conservation efforts and enabling research ranging from identifying biodiversity hotspots to predicting the impacts of climate change. But most of the data is now 30 years old, and it is time for a new atlas. In those 30 years, many environmental changes, notably land use and climate, have impacted on populations of birds across Europe. For effective conservation and informed decision-making, we need the most up-to-date information on these impacts.

A new European Breeding Bird Atlas: EBBA2

The EBCC, together with many partner organisations across Europe, has launched the second European Breeding Bird Atlas (EBBA2). Although the first atlas was impressive, EBBA2 will be bigger and better. New opportunities have arisen, improving the ability to incorporate even the most remote parts of Europe and provide a robust baseline for future monitoring across the whole continent. With this new project – one of the largest biodiversity monitoring projects ever attempted – we aim to:

- provide up-to-date distribution maps for breeding birds across the whole of Europe;
- map relative abundance across Europe for many species, for the first time;
- show changes in species distribution since the 1980s;
- use new analytical approaches to produce better, more accurate maps;
- compile one of the most comprehensive biodiversity datasets in the world;
- build capacity for conservation and monitoring in areas where it is most needed;
- leave a legacy of improved monitoring and research across many countries.

The new atlas will be published as a book, the intention being to deliver it by 2020 at the latest, but with interactive maps and additional material available online. We shall engage with some of Europe's leading scientists and conservationists to identify and communicate its key findings and, importantly, the atlas dataset will be available to the research community for further analysis.

The project is led by the EBCC, the coordinator, Petr Voříšek (Euromonitoring@birdlife.cz), working with a central coordination team and a wider Steering Committee, of which both the BTO and the RSPB are part. We are encouraging a 'bottom up' approach: this is not a single, continent-wide project, but rather a multitude of country projects, all

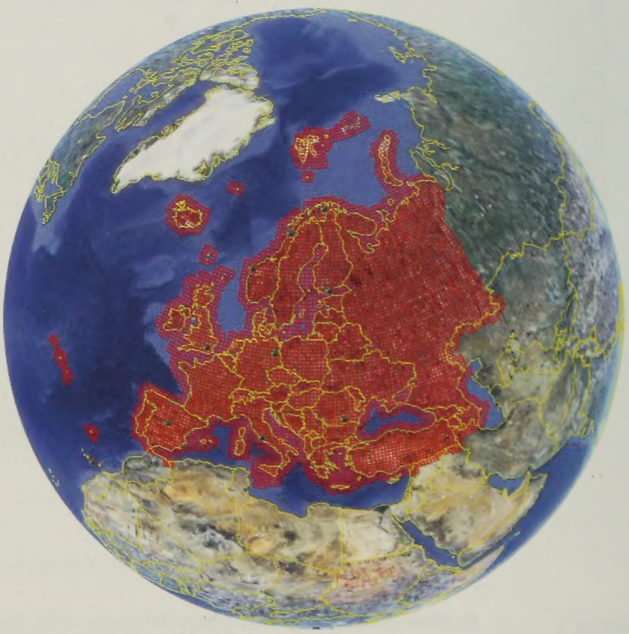


Fig. 1. EBBA2 will cover the whole of Europe, stretching from the Azores in the west to Turkey and European Russia in the east.

of which will contribute data, of a common standard, that can be compiled into a single atlas. Atlas coordinators have been appointed for all European countries, including Turkey for the first time, which brings a range of exciting new species such as Brown Fish Owl *Ketupa zeylonensis* and Grey-necked Bunting *Emberiza buchanani* to a list that currently extends to 582 native and 63 non-native species. Fig. 1 shows the planned extent of EBBA2. EBBA2 will map distribution and relative abundance using 50-km grid squares, but will also seek to collect data from a sample of 10-km squares, in order to model distribution at this finer resolution. Many countries will produce new national atlases, using a finer resolution than for EBBA2, in much the same way that many counties in Britain pursued local atlas projects alongside *Bird Atlas 2007–11* (Balmer *et al.* 2013).

Challenges ahead

We are confident of success – great strides have been made already, and thousands of volunteers are engaged across Europe – but there is still much to do. Funding for this huge project is not yet secured; some contributions have enabled progress on a shoestring to date, and some national atlases have secured funding, but the future is uncertain. By using the efforts of volunteers across Europe, and existing networks, EBBA2 will strive to be efficient and low cost, but the scale of the undertaking is huge and so far we have failed to land major financial support. In a now familiar fashion we will be offering species sponsorship opportunities, and other fundraising activities are planned. If readers are interested in the opportunities to support the project financially, please get in touch.

Beyond funding issues, there are logistical challenges and the basic problem of achieving coverage in countries where there are few birdwatchers. The earlier atlas was one of the first fruits of increased cooperation across the European ornithological community, and in the years since we have seen that community grow and strengthen. Conservation and birdwatching organisations have emerged in countries in the east and south of the continent and, while still small in number and resources, they represent considerable progress since the mid 1980s. The RSPB and other EBCC partners have fostered monitoring programmes for common birds, similar to the UK's BTO/JNCC/RSPB Breeding Bird Survey, in countries across Europe from Portugal to Bulgaria, and now the Pan-European Common Bird Monitoring Scheme (PECBMS) collates data from such schemes in 27 countries, enabling the production of Europe-wide trends for 163 breeding species from 1980 onwards.

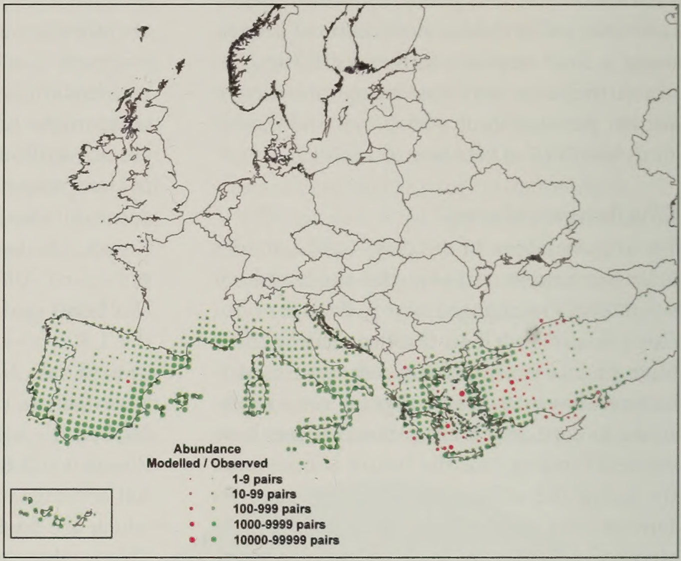
Inevitably, despite this progress, the challenges ahead are many and varied. There are some very large countries with few observers (such as European Russia and Turkey), there are smaller countries with virtually no observers (such as Albania), while the political instability in Ukraine casts doubt on what might be achieved there, although we are not without hope in the face of adversity. Major progress has been made already in some of these countries, most notably in Russia. The team responsible for the recently published *Atlas of the Birds of Moscow City* (Kalyakin *et al.* 2014) have set their targets on the 1,800 50-km squares that lie to the west of the Urals. Nearly 200 Russian birdwatchers have finished surveying 313 squares since 2012, with more underway. Of course, the Russians still have a long way to go to achieve full coverage of those 1,800 squares, many of which are far-flung and without road access. This is where new statistical techniques come to the rescue: we now have the ability to use data from squares that *have* been surveyed, in combination with data on habitat from satellite-based remote sensing, to predict species occurrence and abundance across unsurveyed squares (e.g. fig. 2). As a consequence, atlas fieldwork in Russia and other countries where 100% coverage is unlikely to be achieved is being carefully directed to ensure that a sample of squares are surveyed that are representative of all areas and habitats, to best support the subsequent modelling.

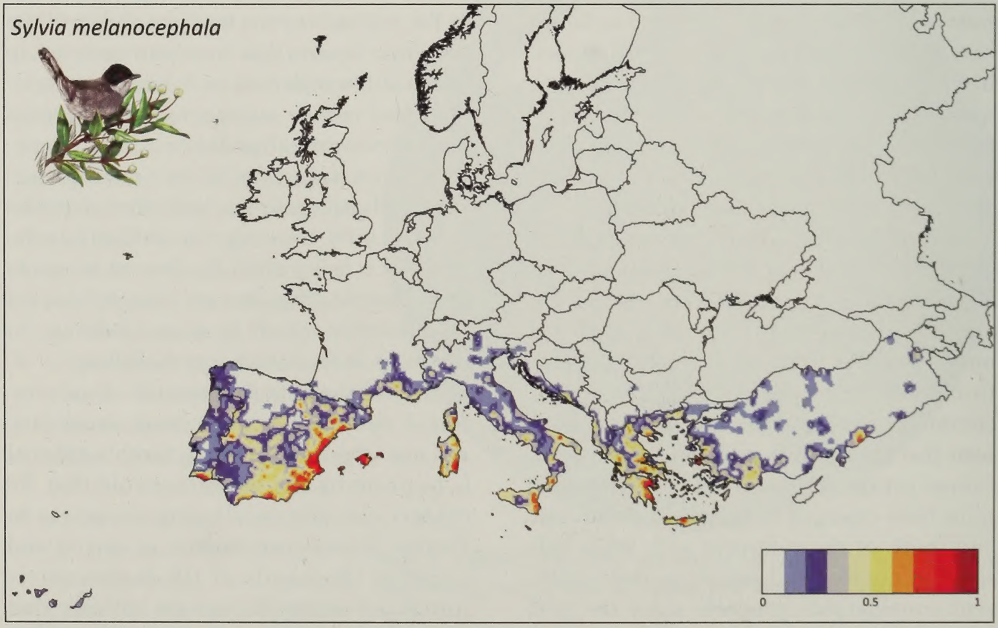
Notwithstanding the potential of such statistical cleverness, nothing beats actual data, and one of the main reasons for this editorial is to promote the important role that *BB* readers can play in atlasing elsewhere in Europe. Every year, mainly in spring and summer, thousands of UK birdwatchers spread out across Europe on holidays that include at least some birding time. And whether that means grabbing an hour or two around a Mediterranean saltpan before the family drags them back to the beach, or exploring high Caucasian peaks in search of Great Rosefinches *Carpodacus rubicilla* and Güldenstädt's Redstarts *Phoenicurus erythrogastrus*, all birders abroad can help.

At the very least, we would like everyone birdwatching in Europe to make relevant records available to the project. This is easily done, since there are a number of existing online data portals that will be passing data to EBBA2, most obviously the BTO/RSPB/BirdWatch Ireland/SOC/WOS BirdTrack system. This rapidly developing, free-to-use system now allows users to submit data from sites *anywhere in the world*, providing a system to record all of a birdwatcher's activity for perpetuity as well as making the data accessible for suitable research and conservation uses. All breeding bird data submitted to BirdTrack will be made available to EBBA2 and national atlases.

Beyond this, we encourage birdwatchers to be more proactive and to consider EBBA2 before they make their holiday plans! For those of you suffering atlas withdrawal

Fig. 2. Simulated EBBA2 maps for Sardinian Warbler *Sylvia melanocephala* based on currently available data, showing: (above) observed (green) and modelled (red) abundance at 50-km resolution, and (below) modelled probability of occurrence at 10-km resolution, where colours display probability from 0 (absent) to 1 (certain occurrence). They demonstrate the wide Mediterranean distribution of this species, with densities highest in the south; the change map may show some northward spread.





Zdenek Tunka

1. Sardinian Warbler *Sylvia melanocephala*, Macedonia, April 2012.

symptoms since the end of *Bird Atlas 2007–11*, here's your chance to get an atlasing fix, to explore exciting parts of the Continent, see great birds and help a vital project at the same time. The EBBA2 team has issued advice to travelling birders at www.ebcc.info/index.php?ID=545, and 19 countries in eastern and southeastern Europe have appealed for particular help. The national coordinators for these countries would be delighted to hear from observers, from groups and from tour operators, who are interested in contributing, whether that be a day's birdwatching in an unsurveyed square, searching for an under-reported species, or full-blown excursions looking to plug major gaps in coverage. Already we have seen expeditions by German birders to Albania, Czechs to Macedonia and Moldova, and Catalonians to Montenegro and Turkey. What can the Brits contribute? There are undoubtedly exciting discoveries to be made: atlas fieldwork has already recorded new breeding species for some countries, while fieldwork in Russia has added Shikra *Accipiter badius* to the list of European breeding birds. What will be next?

Closer to home

It is, of course, a little frustrating that this atlas project should start after the completion of *Bird Atlas 2007–11*, and that the efforts of 40,000 fieldworkers, who amassed 19 million records, lie outside the time period for EBBA2. Although it might be possible to use these maps, and this approach may be used by some countries with recent atlases and without the resources to update them, we feel that we should strive to submit data for the relevant 2013–17 time period for EBBA2. The key detail is that EBBA2 will map breeding bird distribution using 50-km squares – so one square for every 25 10-km squares mapped by *Bird Atlas 2007–11*. You may be relieved to hear that we are not calling for a straight repeat of that exercise! The other advantage is that, as the European atlas project is taking place so soon after *Bird Atlas 2007–11*, we can draw on the expertise and experience of the BTO/BirdWatch Ireland/SOC team behind it.

Much of the existing monitoring effort in the UK can feed into EBBA2 – from BBS, ringing and nest record data to the records reported to the Rare Breeding Birds Panel.

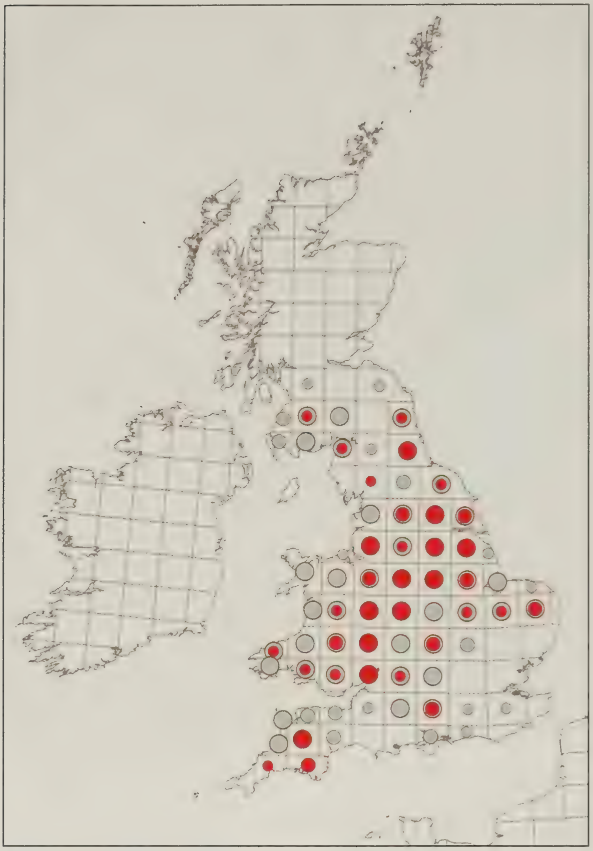


Fig. 3. Maps for Willow Tit *Poecile montana* in Britain at 50-km scale from *Bird Atlas 2007–11* data (grey dots) and BirdTrack data 2013–14 (red dots).

But it is clear that this alone will not be sufficient, and we urge all birdwatchers to submit records of breeding birds through BirdTrack, so that they are available to EBBA2. BirdTrack offers birdwatchers the ability to store all their bird records securely (directly from the field if they use the smartphone app), to produce maps and graphs and to analyse their records, to look at the records of others and, crucially, to share them with recording networks both local and national.

At present, we must admit to some uncertainty as how best to fulfil the UK's part in EBBA2. Will 'passive atlasing' from existing sources be enough to produce robust maps by 2017, or will we need to step up a gear in 2016, say, to ensure that we have no gaps in coverage at a 50-km scale? Fig. 3 shows how the *Bird Atlas 2007–11* map for Willow Tit *Poecile montana* looks if recast at the 50-km scale, and how much of this map can be updated using data from BirdTrack for the two years 2013–14: clearly there are gaps to be filled. We shall continue to monitor prospects for UK coverage – watch this space... And, in the meantime, dust off those breeding evidence codes and enter breeding evidence into BirdTrack!

In conclusion, EBBA2 is a big, exciting and challenging project, running on a shoestring but driven by the energy and enthusiasm of thousands of birdwatchers across Europe. For further information, please see www.ebcc.info, and a special edition of the journal *Bird Census News* (available through the EBCC website); a new EBBA2 website will be launched in 2015.

Acknowledgments

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News and comment

Compiled by Adrian Pitches

Opinions expressed in this feature are not necessarily those of *British Birds*

Keeper seeking to kill Buzzards granted judicial review of refusal

A Northumberland gamekeeper who has repeatedly applied to Natural England to 'control' Common Buzzards *Buteo buteo* preying on Pheasant *Phasianus colchicus* poults in his release pens has been granted permission for a judicial review of NE's decision to refuse him.

Richard McMorn is a self-employed keeper who runs a small-scale shooting enterprise in the north of Northumberland. His High Court action is backed by the National Gamekeepers' Organisation (NGO) and no doubt bankrolled by the shooting community which finds the resurgent Buzzard population – and its protected status – such an inconvenience.

In July 2013, Natural England received an application (presumably from Mr McMorn) under the 1981 Wildlife and Countryside Act for a licence to cage-trap and shoot 16 Buzzards at four sites where he rears Pheasants. The applicant also wanted to kill three Eurasian Sparrowhawks *Accipiter nisus*. The application was refused but the NE assessor accepted his claim that he was suffering predation from Buzzards and this was seriously affecting his livelihood.

It is this apparent inconsistency in the licensing process which led Mrs Justice Thirlwall to grant Mr McMorn leave to bring a judicial review later this year. Another inconsistency in NE's stance towards Buzzard control is that the first-ever licence to destroy Buzzard nests was granted in the spring of 2013 to an applicant believed to be Mr McMorn.

RSPB Conservation Director Martin Harper demanded sight of the licence applications under the Freedom of Information regulations. You can see much of the documentation on Martin's blog post for 25th September 2013 on the RSPB website www.rspb.org.uk It makes interesting reading.

The NGO quoted Mr McMorn as saying: 'This is a real David and Goliath situation. I am having to battle the might of the state in the form of Natural England to protect my birds and my job. They admit I've got a problem and agree that I have done everything I can but still they won't give me a licence. It's unfair and it's wrong. Hundreds of other people get licences to kill protected birds every year.'

And the NGO added: 'This case is about a gamekeeper who is trying to do the right thing within the law to address a real and serious threat to his livelihood. NE has a duty to administer licensing fairly, yet the facts speak for themselves. Extensive discussions with NE about solving our member's problem and saving his job have got nowhere. It is time to let the High Court decide whether NE has been acting in accordance with the law.'

The High Court case will be watched with great interest by both the shooting and the conservation communities. If granted, the application to shoot Buzzards would set a lethal precedent, overturning more than 60 years of legal protection for Britain's raptors.

Mr McMorn – or another gamekeeper called Richard McMorn and also from Ancroft in Northumberland – previously appeared in these pages in November 2007 (*Brit. Birds* 100: 687) when he was fined £600 by Berwick magistrates after he pleaded guilty to four pesticide offences. Two of the products involved were banned pesticides. One of these, carbofuran, was banned in 2001 and has consistently been the most regularly abused product for the preparation of illegal poison baits. McMorn claimed he had used this product for killing wasps, although this former agricultural pesticide was never approved for that purpose.

Scottish gamekeeper faces jail for Goshawk killing

A Scottish gamekeeper has been found guilty of killing a Northern Goshawk *Accipiter gentilis* and setting traps illegally to capture two others on an Aberdeenshire estate.

George Mutch, 48, of Kildrummy, was accused of recklessly killing or injuring a Goshawk and illegally taking away another Goshawk and a Buzzard in 2012. He was found guilty of four charges at Aberdeen Sheriff Court. Sheriff Noel McPartlin said he would consider a custodial sentence when Mutch is back in court later this month. It is one of the first times in Scotland that hidden camera footage, obtained by the RSPB, has been used in a case of this kind.

After the case, Duncan Orr-Ewing, head of species and land management at RSPB Scotland, said: 'We welcome the conviction of George Mutch. This long-running case, informed by evidence from RSPB Scotland staff, has finally delivered some justice. To witness the destruction of a specially protected bird of prey in this callous manner was truly shocking. Crimes against protected birds of prey are an affront to the people of Scotland and damage the reputation of the sport shooting industry. We commend those estates that operate within the law, but expect a better performance from this sector in future.'

A spokesman for the Scottish Gamekeepers Association (SGA), which has now banned Mutch, said they would not condone anyone taking the law into their own hands. But he said that the SGA believed it was wrong for individuals 'from one particular profession' to be under surveillance in their place of work without their knowledge. The spokesman added: 'It is not right for Scottish government to deny people whose livelihoods come under pressure, due to the activity of certain species or animals, recourse to a legal solution to solve that conflict.'

Allen's Gallinule breeding in Europe

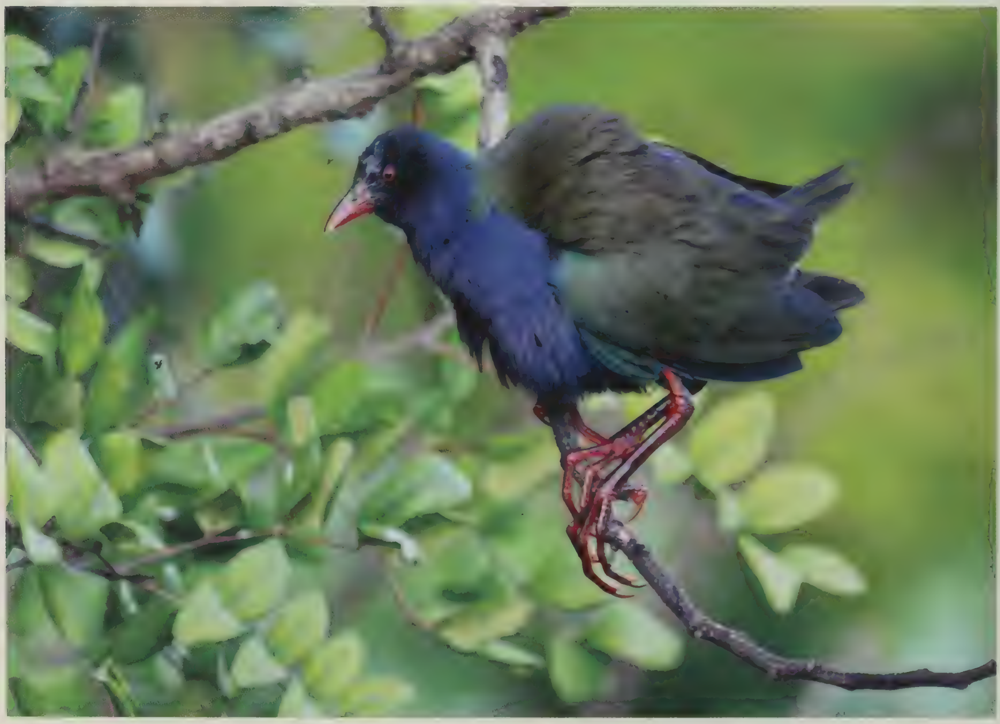
In 2014, a pair of Allen's Gallinules *Porphyrio alleni* bred successfully in Malta, raising three young, which constitutes the first breeding record for Europe. Two adults and three young birds were first observed on 19th July, by Natalino Fenech.

Allen's Gallinule is a vagrant in the Maltese Islands. The first record was on 2nd December 1976, and was followed by three records in 1977, two in 1979, singles in January 1994 and October 1999, then three in 2010, five in 2011 and one in January 2012, before records of two males in December 2013, one of which was observed to February 2014. Allen's Gallinule has been recorded as a vagrant in other parts of Europe, and there are records from Spain (and the Canary Islands), Britain (see *Brit. Birds* 96: 565; 102: 399–402), France, Germany, Italy, Greece and Finland. In most cases the birds are found moribund, and exhausted birds have been found in Malta too.

It is presumed that the male of the breeding pair is one of the two males seen between December and February in approximately the same area.

Allen's Gallinule breeds in marshes and lakes in sub-Saharan Africa. Although some birds are sedentary, remaining in certain permanent wetlands throughout the year, those in the northern tropics usually move north and populations in the southern tropics move south at the onset of the rains.

(Contributed by Natalino Fenech and Michael Sammut)



Natalino Fenech

2. Male Allen's Gallinule *Porphyrio alleni*, Malta, January 2014.

Defra awards the world's largest rat-eradication funding as the project reaches its final phase

The UK Government has awarded the South Georgia Heritage Trust (SGHT) funding of nearly £250,000, helping to secure the survival of one of the world's most important seabird sanctuaries, on the sub-Antarctic island of South Georgia.

Supporting the world's largest rat-eradication project, the grant comes from the Overseas Territories Environment and Climate Fund (Darwin Plus), a programme that gives funding to help protect some of the world's most threatened species in the UK's Overseas Territories (UKOTs). Ten other projects will receive grants thanks to £1.5m of new government funding to protect biodiversity and the natural environment in the UKOTs.

Globally, invasive species are second only to habitat loss in reducing biodiversity. This impact is especially pronounced on islands, and many of the UKOTs have lost endemic fauna for this reason. The introduction of rodents to an ecosystem that has evolved in the absence of mammals has seen the extermination of several species on most of the mainland of South Georgia, including the South Georgia Pipit *Anthus antarcticus*, and has hugely reduced the populations of many other birds.

The funding comes at a critical time for the SGHT as the final phase of the Habitat Restoration Project begins in January 2015. The Trust's mission is to reverse the ecological destruction wrought by rodents that were introduced inadvertently by sealers and whalers over a period of 200 years.

A successful trial phase in 2011, followed by a second phase conducted in 2013, saw 65% of the island's rat-infested areas baited, making this project five times larger than any other rodent eradication ever attempted. The final phase will cover an area of 364 km^2 over a period of three months using three former air ambulance helicopters and a team of 18 workers to spread 95 tonnes of bait over the remaining area.

Once the baiting is completed in the brief sub-Antarctic summer months, a further two years of monitoring will take place. Assuming no signs of rodents have been discovered at the end of this time, South Georgia will be declared free of rodents for the first time since humans first came to the island.

The project is now close to reaching its funding target of £7.5m, enabling the team to push ahead with protecting some of the world's most threatened bird species that inhabit South Georgia.

Howard Pearce, chairman of the SGHT, said: 'The Trust is delighted with this generous grant from Defra, which brings us very close to achieving our fundraising target. The impact of the project, once completed, will be spectacular. Our vision is to return South Georgia to the pristine state in which Captain Cook discovered it in 1775.'

Chris the Cuckoo with 60,000 miles on the clock

Since being fitted with a satellite tag by the BTO four years ago, Chris the Cuckoo, named after TV Wildlife Presenter Chris Packham, has travelled over 60,000 miles – nearly 100,000 km and the equivalent of flying twice round the world; and he's taken in 22 different countries along the way.

The loss of a staggering 72% of our Common Cuckoo *Cuculus canorus* population over the last 25 years prompted the BTO's satellite-tracking project, in a bid to discover the factors driving this decline. Starting in 2011, five Cuckoos were fitted with state-of-the-art tags enabling us to follow the birds to Africa. The tags were believed to have a lifespan of around 2–3 years and during that first migration three birds were lost, but they gave us a wealth of information, unveiling for the first time where exactly our Cuckoos went for the winter: the Congo rainforest in central Africa. Crucially, the results also pinpointed the routes the birds took to get there.

Of those first five, Chris is the only Cuckoo still going, and still transmitting live data, far exceeding all expectations. Chris is currently in the Congo rainforest, having arrived at his favoured winter location on 25th October, the latest leg of that 60,000-mile odyssey of discovery. BB, the Cuckoo sponsored by *British Birds*, is now back in Africa for the third winter carrying his satellite tag fitted in spring 2012.

Chris Hewson, lead scientist on the project at the BTO, said: 'Chris the Cuckoo is a real hero of ornithology, the tag he is carrying has helped us to understand the pressures that he and other Cuckoos face on what is a pretty hazardous migration to Africa. He has survived sand storms, hail storms, an exceptionally cold, wet summer, predators over the Mediterranean and in the Congo rainforest, and has crossed the Sahara Desert a whopping seven times since we started following him. We have everything crossed in the hope that he makes it back next spring.'

Follow all the satellite-tagged Cuckoos at www.bto.org/cuckoos

Patchwork Challenge 2015

Back for its third year, Patchwork Challenge (PWC) is the competition for the dedicated patch birder, the patch newcomer and all stages in between. The aim is simply to find as many species of bird as you can in 2015 *on your patch.* In 2013 there were 188 patches in the mix so the 239 in 2014 represented a significant growth of the competition. There are patches in all corners of Britain & Ireland and the strength of so much variety is that there will be some local competition to spur you on.

Graham Catley

3. Blyth's Pipit *Anthus godlewskii*, Pugney's Country Park, Yorkshire, December 2014.

Vibrant social media is a focus of Patchwork Challenge to keep contestants engaged with the competition. Twitter is the day to day hub with contestants coining the hashtags **#PWC2015** and **#patchgold** to highlight their success or otherwise. Extended discussions take place on the Facebook group and plentiful posts on the blog on best finds, inland goings on and local mini-leagues keep everyone up to date. We have crossover with other organisations such as Birding Frontiers, BirdGuides and Next Generation Birders, with regular features on their websites.

In 2014, over 335 species were recorded by contestants, with highlights such as Brünnich's Guillemot *Uria lomvia*, Eastern Bonelli's Warbler *Phylloscopus orientalis* and Collared Flycatcher *Ficedula albicollis*. The second Yellow-browed Warbler *P. inornatus* for Warwickshire was also a feature of autumn 2014 and we ensure that we don't neglect inland areas by providing a dedicated correspondent.

In 2015, new developments include a new website, underpinned by a new database that will make PWC more accessible for those taking part and it is hoped to have this operational early in the new year so that live scores can be viewed and contestants get a personal PWC home page. Please visit www.patchworkchallenge.blogspot.com to find out more and to take part.

Stop Press: Patchworker Jonathan Holliday struck 'patch gold' in mid December with Yorkshire's first Blyth's Pipit *Anthus godlewskii* (plate 3). You can read his finder's account here: www.rarebirdalert.co.uk/v2/Content/Blyths_Pipit_West_Yorkshire_Dec_2014.aspx?s_id=392435085

(Contributed by James Spencer)

New BBRC member confirmed

Following the announcement in the November 2014 issue (*Brit. Birds* 107: 701), Micky Maher has been confirmed as the successful candidate to replace James Lidster on the Rarities Committee, with effect from 1st January.

Eric Hosking bursary

The 2014 bursary awarded by the Eric Hosking Charitable Trust (www.erichoskingtrust.com) went to Michael Gichia, for his project to encourage local communities in the Taita Hill forest of Kenya to help in the conservation of the critically endangered Taita Apalis *Apalis fuscigularis* and Taita Thrush *Turdus helleri*. Photography will be used to illustrate an awareness leaflet and exhibition. A short video will also be made.

The 600th British bird

Will 2015 be the year when the British List reaches the 600 milestone? The official List, maintained by the BOURC, currently stands at 597. Taxonomic changes, such as that involving the Subalpine Warbler *Sylvia cantillans* complex, may push the total to the 600 threshold. But if it's to be a new arrival, a first for Britain, then what is your prediction?

Norwegian birder Geir Mobakken has taken a punt on a species that has reached our North Sea neighbours in the Netherlands but has yet to make landfall here: Grey-necked Bunting *Emberiza buchanani*. All other suggestions gratefully received at the usual e-mail address adrianpitches@blueyonder.co.uk

There may even be a small prize for the person who correctly guesses Britain's 600th bird…

European Medicines Agency ruling on diclofenac

Unbeknown to anyone outside the veterinary-medicine community, it seems that the vulture-killing drug diclofenac has been licensed for use in Italy since 1993. It was about that date that its impact started to be noted in the Indian subcontinent, where 99.9% of *Gyps* vultures had been wiped out by 2004, when diclofenac in cattle carcases was identified as the killer.

The decision to licence diclofenac for use in Spain – with its internationally important vulture populations – in 2013 prompted BirdLife to call for a Europe-wide ban. In August last year the European Commission asked the European Medicines Agency for an opinion from the Committee for Medicinal Products for Veterinary Use on the risks to vultures and 'other necrophagous bird populations' posed by diclofenac. The Committee has now reported back and its long-awaited conclusion is: 'The Committee is of the opinion that additional risk management measures are needed and efforts should focus on determining the most suitable and effective ones to ensure that contaminated carcases do not end up in the food chain of vultures and other necrophagous birds.'

That sounds like a rather ineffectual recommendation; however, one risk management measure could be an EU-wide ban on diclofenac. It's now up to the European Commission to decide a course of action.

You can read the full opinion of the Committee here: www.ema.europa.eu/docs/en_GB/document_library/Other/2014/12/WC500178925.pdf

Recognising that this is a serious and pressing conservation problem, *BB* has awarded a conservation grant of £1,000 to BirdLife's vulture appeal, which aims to identify and tackle the ongoing threats in Europe and Africa.

BB Bird Photograph of the Year 2015

The 39th *BB* Bird Photograph of the Year competition is free to enter and seeks to recognise the best and/or the most scientifically interesting photographs of Western Palearctic birds taken during 2014.

The closing date for the competition is 29th March 2015.

In addition to the main awards, there is a digiscoping section. Up to three images may be entered for each competition. For full details of the rules and how to submit entries, go to www.britishbirds.co.uk/about/bird-photograph-of-the-year

The competition's main sponsor in 2014 will again be **Anglian Water**, to whom we remain extremely grateful. Collins, Christopher Helm/Bloomsbury and the Eric Hosking Charitable Trust will continue their long-term support of the Award too. The winning entries will be exhibited at the British Birdwatching Fair in August, where the awards will be presented.

Changes to the *BB* list of names

Following taxonomic changes to the British List announced in October 2014 by the BOURC's Taxonomic Sub-committee, the *BB* list of Western Palearctic birds has been updated from the beginning of *BB* Vol. 108 – go to www.britishbirds.co.uk/birding-resources/the-british-birds-list to download the revised list. The TSC report can be found in full online (http://onlinelibrary.wiley.com/doi/10.1111/ibi.12091/pdf), and explains the rationale behind these changes.

New county bird recorders

Anglesey Robin Sandham, Neckarmont, Woodlands, Conwy LL32 8LT; tel. (07584) 320882; e-mail robinsandham@hotmail.co.uk

Norfolk Chris Allen, Marsh Farm, North End, Thorpe-next-Haddiscoe, Norwich NR14 6PY; tel. (01508) 548095; e-mail birdrecorder@nnns.org.uk

For extended versions of many of the stories featured here, and much more, visit our website www.britishbirds.co.uk

The ecology and conservation of the Marsh Tit in Britain

Richard K. Broughton and Shelley A. Hinsley

Abstract The Marsh Tit *Poecile palustris* is one of several British woodland birds to have suffered a serious population decline in recent decades. Its abundance has fallen by almost three-quarters since the 1960s while its range has contracted by a fifth, placing it on the UK's Red list. Extensive research over the last decade has built upon earlier studies to greatly increase the understanding of Marsh Tit behaviour and habitat requirements, with valuable context provided from elsewhere in Europe. This indicates that the population decline in Britain has occurred alongside an apparent improvement in habitat quality, and despite breeding success remaining high. Attention has now focused on a combination of reduced survival and a loss of woodland connectivity as a plausible mechanism for the decline, although work is continuing to help us to understand how these factors might interact. With a relentless downward population trend and no sign of a recovery for the Marsh Tit, measures are suggested that may help to conserve remaining populations.

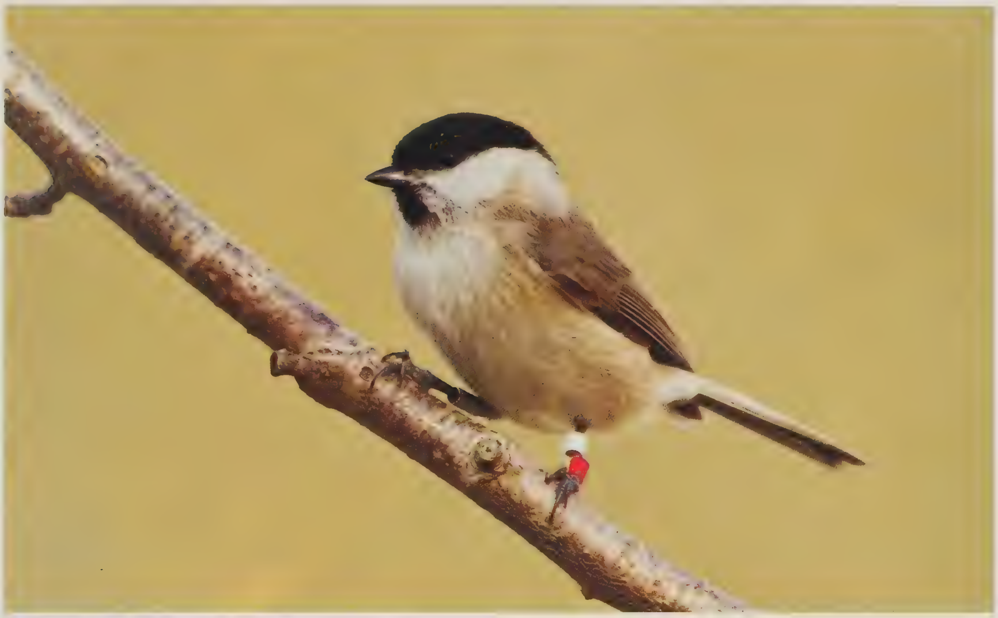
Introduction

Although still widespread across much of England and Wales, the Marsh Tit *Poecile palustris* is now much less familiar in Britain than its commoner relatives – Blue *Cyanistes caeruleus*, Great *Parus major* and Coal Tit *Periparus ater* – and is recorded by less than 6% of BirdTrack observers throughout the year (BTO/RSPB/BirdWatch Ireland/SOC/WOS 2014). Yet the Marsh Tit has an eventful history in British ornithology, and generations of birdwatchers have struggled to distinguish it from the very similar Willow Tit *P. montana* (see Broughton 2009).

The Marsh Tit is also one of a group of British woodland birds to have undergone a severe decline in abundance since the 1960s, and as a consequence it is now on the Red list of *Birds of Conservation Concern* (Fuller *et al.* 2005; Baillie *et al.* 2014). These trends have prompted numerous studies over the last decade, and findings have been summarised in *BB* for the Willow Tit (Lewis *et al.* 2009; see also Last & Burgess 2015), Common Nightingale *Luscinia megarhynchos* (Holt *et al.* 2012) and Lesser Spotted Woodpecker *Dendrocopos minor* (Smith & Charman 2012).

The Marsh Tit was an early subject of intensive field study, with classic papers in the 1950s exploring the species' behavioural ecology at Bagley Wood, near Oxford (Southern & Morley 1950; Morley 1953). This provided a basis for further studies, to investigate the species' ecology and habitat requirements in relation to the recent population decline; these began in 2003 and have focused on Monks Wood in Cambridgeshire (Broughton 2012a; see Box 1) and Wytham Woods in Oxfordshire (Carpenter 2008).

Studies from elsewhere in the Marsh Tit's range also provide valuable context, notably from Poland's Białowieża National Park, the last remnant of near-primeval primary forest in Europe (Tomiałojć & Wesołowski 2005). This gives baseline information on Marsh Tit ecology under 'natural conditions', in forest



Garth Peacock

4. First-winter male Marsh Tit *Poecile palustris*, Cambridgeshire, February 2013. The pale mark at the base of the bill and the grey-brown wash behind the ear-coverts help to distinguish it from the Willow Tit *P. montana*.

that most closely approximates the original habitat in which the species evolved. Comparing findings from Białowieża with those from the highly fragmented secondary woodlands of Britain can offer insights into how and why Marsh Tits here are struggling, and this paper aims to summarise our current knowledge.

Range and population

Marsh Tits inhabit deciduous and mixed forests from Europe's western seaboard east to Russia, between latitudes of 40° and 60°, with another, disjointed, population in east Asia. Although the species is listed as of 'Least Concern' by IUCN, with a global population of up to 72 million birds, the European population declined by 36% between 1982 and 2006 (PECBMS 2009; www.birdlife.org).

The five, poorly differentiated, European subspecies show a clinal variation from west to east, with the smallest and darkest form being *P. p. dresseri* of Britain and western France (*BWP*). The paler and larger nominate form is found across much of mainland Europe, but not in Scotland and northern England as once thought (Broughton 2009).

The Marsh Tit's status in Britain was largely unknown at the beginning of the twentieth century owing to confusion with the previously overlooked Willow Tit, but it was considered widespread. The first national bird atlas, based on fieldwork in 1968–72, recorded Marsh Tits in every county of England and Wales except Anglesey, with an estimated 70,000–140,000 territories (Sharrock 1976). A range contraction of 17% was apparent by the time of the second atlas, in 1988–91 (Gibbons *et al.* 1993), with a further 7% loss shown by *Bird Atlas 2007–11* (Balmer *et al.* 2013; see Appendix 1).

These range contractions coincided with a 73% decline in abundance since 1967, including a 28% reduction between 2001 and 2011 (Baillie *et al.* 2014). An estimate of 60,000 territories in 1988–91 was revised down to 41,000 in 2009, including a Scottish population of just 40–50 pairs in Borders and Lothian (Murray 2007; Musgrove *et al.* 2013). The Marsh Tit is now patchily distributed in northern England but remains widespread throughout parts of the Midlands, southern England and Wales. It is an extreme rarity in Scotland away from its toehold in the south-east, but with extralimital records more than 100 km from breeding populations (Murray 2007). The only accepted record for Ireland is from Co. Wicklow in 1990 (Merne 1993), and an attempted introduction to Co. Tipperary in 1909–11 was unsuccessful (Barrington 1911).

Garth Peacock

5. Marsh Tit, Cambridgeshire, February 2013. The rounded tail-feather tips are typical of an adult, and a wing length of 65 mm at ringing indicated a male, which was confirmed by breeding behaviour. Wing length of adult males is typically 64 mm or more, and of adult females 63 mm or less (Broughton *et al.* 2008).

Habitat and breeding density

Despite the name, which is a hangover from the confusion with the Willow Tit, the Marsh Tit is a specialist of broadleaved woodland and has no particular association with wet habitats. The structural complexity of woodland is important for Marsh Tits, though, particularly multiple layers of vegetation through the vertical profile. In British woods this is typically represented by a tree canopy above a dense understorey layer, and there is a preference for mature, unmanaged woodland with a tree canopy in excess of 15 m tall and 80% closed, overlying a shrub layer of at least 4 m in height and 40% ground coverage (Hinsley *et al.* 2007; Carpenter *et al.* 2010; Broughton *et al.* 2012a,b). The habitat structure of breeding territories appears more significant than the species of trees and shrubs, although oak *Quercus* trees are preferred for winter foraging (Broughton *et al.* 2014), and habitat diversity may be important for providing a range of food sources throughout the year.

Average densities in Britain have fallen by 39% since the 1960s, to one territory per 20 ha of woodland (Amar *et al.* 2006). In large woods, however, such as Monks Wood (155 ha) and Wytham Woods (370 ha), breeding densities are similar to those in the Białowieża Forest, at 2–3 territories per 20 ha, suggesting that this is a typical density in optimum habitat (Broughton *et al.* 2006; Carpenter 2008; Wesołowski *et al.* 2010).

Breeding territories are unusually large for a small passerine, averaging 5–6 ha with a range of 1.5–14.0 ha in England (Broughton *et al.* 2012a) and 1.5–19.0 ha in Białowieża (T. Wesołowski pers. comm.). The reason for such large territories is unclear, but this requirement certainly limits the population density and also the minimum size of wood that can be occupied. A high-quality breeding territory for a single pair requires a wood of at least 4.5 ha, to include sufficient woodland interior habitat (Broughton *et al.* 2012b), but suboptimal territories can incorporate woods as small as 1 ha if adjacent to additional habitat, such as scattered trees and hedgerows.

Marsh Tits are highly sensitive to habitat fragmentation, and occupation becomes increasingly unlikely in woods that are smaller and more isolated in the landscape. In the Netherlands, Opdam *et al.* (1985) showed that the probability of woods being occupied was much lower for those furthest away from a large woodland (and its source population). In eastern England, the probability of occupation was only 20% for woods of 5 ha, rising to 70% at 10 ha and only approaching 100% at 25 ha (Hinsley *et al.* 1996). Yet three-quarters of the woods in England and Wales are smaller than 10 ha, so only a minority of woodland patches have a high chance of being occupied (Broughton 2012a).

The effect of habitat fragmentation is particularly evident in parts of eastern England. In the Lincolnshire Limewoods, east of Lincoln, just 5 km of open fields separates 380 ha of seemingly good habitat around Bardney from established Marsh Tit populations at nearby Potterhanworth, but this appears enough to prevent colonisation. Similarly, in east Yorkshire, 130 ha of wooded parkland on the Wassand, Rise and Burton Constable estates (between Hull and Hornsea) seems suitable for Marsh Tits, but 10–15 km of arable farmland isolates the woods from potential colonists to the west, and they remain unoccupied.

Box 1: Studying Marsh Tits

An array of methods was required to study the Cambridgeshire Marsh Tits *Poecile palustris.* To colour-ring the population a simple cage-trapping method was designed to selectively capture almost the entire population each year, totalling over 950 birds to date. Wing length, moult limits and tail shape distinguish age and sex classes with a high degree of probability, and breeding behaviour provides confirmation (Broughton *et al.* 2008).

Winter ranging and social organisation was studied by radio-tracking, and breeding territories are mapped using playback and by following birds for extended periods, before digitisation and analysis in a Geographical Information System (GIS). Overlapping a time-series of territories for successive years revealed areas of high and low occupation, and comparing the woodland vegetation between them identified habitat preferences (Broughton *et al.* 2006, 2012b).

Remote sensing can be used to map the vegetation height, coverage and species composition of entire woods in great detail. We used a lidar laser scanner mounted on an aircraft to map the tree canopy and understorey layers in target woods (fig. 1), and a time-series of airborne hyper-spectral reflectance data to map tree species (Hill *et al.* 2010). This combination of territory mapping and remote sensing allowed habitat selection to be analysed in unprecedented detail (Broughton *et al.* 2012a,b).

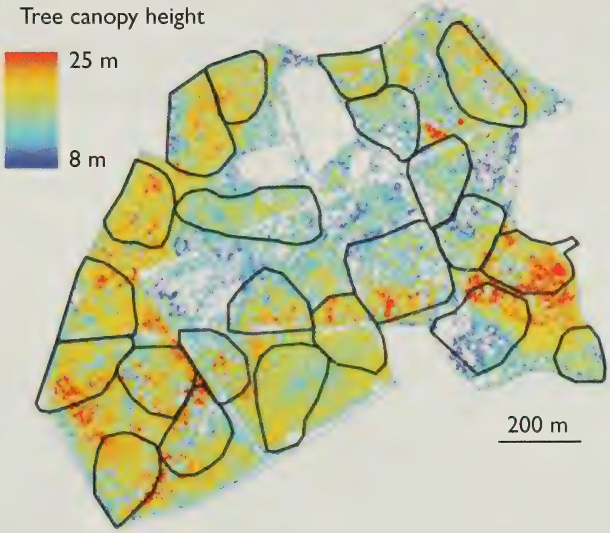


Fig. 1. A tree canopy height model of Marsh Tit *Poecile palustris* habitat at Monks Wood, Cambridgeshire, derived from airborne lidar (light detection and ranging), a laser scanning technique. Orange and red colours indicate taller, mature tree canopy and blue colours shorter, scrubbier canopy. Marsh Tit territories for 2004 are outlined in black, showing a distribution favouring mostly the taller areas of woodland.

Nests in natural holes are monitored using an endoscopic digital camera and by observing adult behaviour, and chicks are extracted for ringing and blood sampling to investigate dispersal and genetic isolation between woods (Broughton *et al.* 2011). Nest-monitoring and ringing are more easily achieved in nestboxes, and a new design that mimics natural cavities was trialled in an attempt to increase the uptake (Broughton & Hinsley in press).

Richard Broughton

6. Adult male Marsh Tit of the nominate subspecies, at a nest in Białowieża National Park, Poland, June 2013. This form is paler and approximately 5% larger and heavier than the British subspecies *dresseri*. Note the narrow entrance to the nest cavity, here a rot-hole in the scarred trunk of a Small-leaved Lime *Tilia cordata*.

Social structure

Marsh Tits are highly sedentary around the breeding territory, which they generally occupy for life as socially monogamous pairs. These pairs can form in any month, and 'divorce' is uncommon, estimated to be just 2–3% per year (Southern & Morley 1950; Amann 2003; Broughton *et al.* 2010). Polygyny is also rare, being recorded in Cambridgeshire on four occasions over 12 breeding seasons (Broughton 2006).

Territories are strictly defended from March to June (Southern & Morley 1950), but territory boundaries relax after breeding to form the core of an expanded home range of at least 10 ha in winter (Broughton *et al.* 2014). In Scandinavia, an adult pair forms a stable winter flock with unrelated juveniles to defend a group home range (Nilsson & Smith 1988), but in Britain the home range of a breeding pair typically shows a partial overlap with those of their neighbours and, from early summer, many newly independent juveniles form pairs and establish their own overlapping home ranges among the adults (Broughton *et al.* 2010). In Cambridgeshire, we have observed up to nine birds foraging together where home ranges coincided, often joining mixed tit flocks, but groupings varied with location. Pairs or individuals may also forage alone and make excursions hundreds of metres beyond their normal home range to visit rich food sources, such as bird feeders (Morley 1953; Broughton *et al.* 2010).

Allowing juveniles to establish overlapping home ranges during the non-breeding season provides adults with a prospective replacement breeding partner in the event of being widowed (Morley 1950). Up to 10% of juveniles adopt a different strategy and become subordinate 'floaters' (Nilsson & Smith 1988; Broughton *et al.* 2010) and our radio-tracking studies found that such birds ranged up to 1.5 km across many home ranges, perhaps spreading their chances of being able to settle should an occupant die.

Beginning in January, and peaking in March–April, dominant males sing frequently in defence of the territory, while females sing very rarely (*BWP*; Morley 1953; Broughton 2008, 2009). Juveniles that are unable to secure a spring territory are evicted from their home-range area by dominant pairs, and some widowed adults may also abandon their territory at this time to search for a breeding opportunity elsewhere. This creates an important dispersal period between February and April when transient birds can replace winter losses in other areas, and many breeding pairs are formed at this time (Morley 1950; Amann 1997; Broughton *et al.* 2010).

Food and foraging

Marsh Tits consume a wide variety of plant and insect food throughout the year (*BWP*). Seeds of trees and herbage are important during autumn and winter, including beech *Fagus*, birch *Betula*, thistles (Cynareae) and knapweeds (Centaurea). Seeds are also extracted from fruits and berries (the pulp is discarded) of shrubs such as Elder *Sambucus nigra*, Crab Apple *Malus sylvestris* and hawthorn *Crataegus*, with Honeysuckle *Lonicera periclymenum* and Spindle *Euonymus europaeus* being especially favoured.

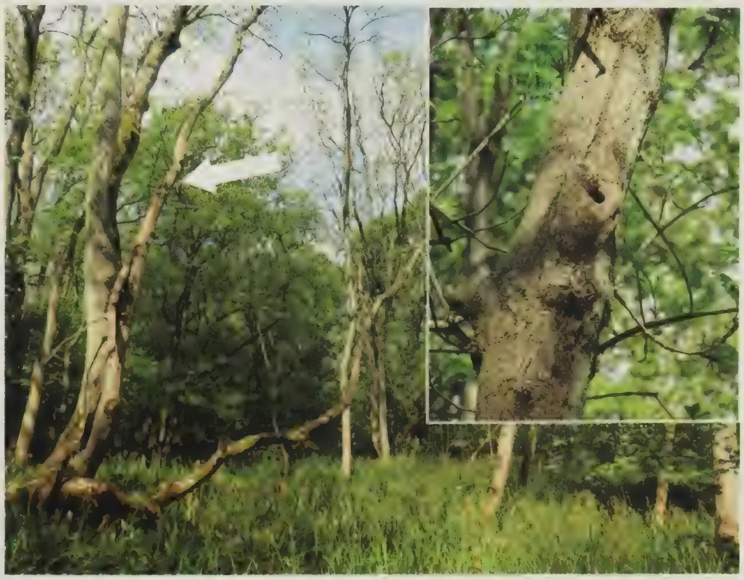
From late summer to winter, large quantities of seeds are cached for later retrieval, usually hidden under tree bark, moss or dead leaves (*BWP*). Most autumn and winter foraging in English woods occurs in understorey shrubs up to mid levels of the tree canopy, with some activity on/near the ground and in the treetops. There is substantial niche overlap with Blue and Great Tits, but Marsh Tits are dominated by both and could sometimes be excluded from preferred foraging sites, such as oaks (Gibb 1954; Carpenter 2008).

The spring and summer diet is mostly invertebrates gleaned from trees and shrubs, and we observed prey items as large as adult Copper Underwing moths *Amphipyra pyramidea* being taken in Cambridgeshire. In early spring, birds will methodically dismantle the catkins of sallows *Salix* and buds of trees such as birches and elms *Ulmus*, but it is unclear whether the target is plant material or insects (Fryer 1939; Betts 1955). Birds in Monks Wood were also observed drinking nectar from Blackthorn *Prunus spinosa* blossom and sugary sap from a damaged Field Maple *Acer campestre*. Caterpillars and spiders form the bulk of the nestling diet, gathered by adults generally within 25 m of the nest but occasionally over 50 m distant (Carpenter 2008; Cholewa & Wesołowski 2011).

Nest sites and nestboxes

Marsh Tits breed in a pre-existing hole in a tree or shrub. Females can enlarge an existing cavity but, unlike the Willow Tit, will never create a nest chamber from scratch (Morley 1953; Wesołowski 1999). Nest-site prospecting peaks in March and the female chooses a suitable hole by early April (Morley 1953), usually in mature woodland. For experienced females this is commonly in the central part of the territory but nest placement appears more random for first-year birds (Broughton *et al.* 2012a).

The nest cavity may be a rot-hole, split or crevice in a stem, limb, stump or among roots, or occasionally in an old woodpecker hole or a nestbox (Wesołowski 1996; Broughton *et al.* 2011). Cambridgeshire nests were situated between ground level and 10 m high in a variety of trees and shrubs, although some preference was shown for knotholes 0–4 m high in young, live Ash *Fraxinus excelsior* (Broughton *et al.* 2011). Ash trees are currently common and widespread in Britain but under threat from the *Chalara fraxinea* 'Ash dieback' fungal disease. However, in Oxfordshire most nests were 0–2 m high in Elder (Morley 1953; Carpenter



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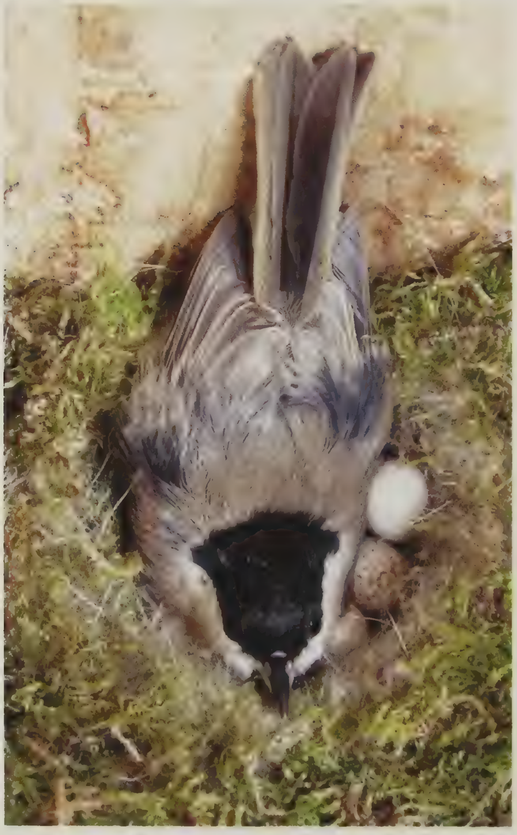
7. A Marsh Tit nest tree in Cambridgeshire, May 2013. The nest (arrowed) is in a knothole, 4 m high in a semi-mature Ash *Fraxinus excelsior*. Inset shows detail of the small nest hole.

2008), and in Poland's Białowieża Forest the average height was 5–6 m in Hornbeam *Carpinus betulus*, Small-leaved Lime *Tilia cordata* and Alder *Alnus glutinosa* (Wesołowski 1996). This variation shows that Marsh Tits are quite flexible in their choice of nest site, and suitable holes do not appear to be in short supply in British woods (Broughton *et al.* 2011).

Marsh Tits prefer nest cavities with a narrow entrance and generally avoid dead wood, which may be adaptations to limit access by predators and competitors (Wesołowski 1996, 2002; Broughton *et al.* 2011). Nest-site competition does appear to be rare, with a narrow entrance often excluding Great Tits, while Blue Tits can be successfully driven away from nests by fierce physical attacks, a reversal of the usual dominance hierarchy (Broughton *et al.* 2011, pers. obs.).

Use of nestboxes is uncommon in Britain, perhaps because Marsh Tits prefer smaller cavities and have a large territory with sufficient natural holes to choose from (Broughton *et al.* 2012a). Large territory size also means that breeding density is generally limited by the availability of habitat rather than nest sites; therefore provision of nestboxes will not increase the number of breeding pairs. Nestboxes make it easier to monitor and ring nestlings, however, and our trial of targeted small nestboxes in Cambridgeshire had an annual uptake of up to 19%, although overall uptake was very low (Broughton & Hinsley in press). Sells (1984) also reported just 12% occupation in a nestbox scheme in a plantation of larch *Larix* and beech at Bourton Wood, Gloucestershire.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8. Female Marsh Tit incubating eggs in a nestbox in Cambridgeshire, May 2005. The nest is a cup of moss lined with animal fur, and the pointed tips to the tail feathers indicate that this bird is a first-year.

Nests, eggs and young

Females begin nest-building in early April, typically 10–15 days before egg-laying (Morley 1953; Wesołowski 2013). Nests are made of a moss base lined with a dense layer of animal hair, fur or wool, and occasional artificial fibres, plant down or, rarely, small feathers (Morley 1953; Ludescher 1973).

Clutch size ranges between four and 11 eggs in Britain, and the average of 7–8 has remained unchanged since the 1960s (Baillie *et al.* 2014), with similar clutches in Białowieża and elsewhere in Europe (Ludescher 1973; Markovets & Visotsky 1993; Wesołowski 2000; Broughton *et al.* 2011). Breeding is highly synchronised within populations, and most females begin laying within a ten-day period (Wesołowski 1998; our unpublished data). The average laying date in Britain has advanced by 11 days since the 1960s, to 17th April (Baillie *et al.* 2014). This is probably a response to a warming climate, since there is a strong relationship between warm spring temperatures and early laying (Wesołowski 1998; Dolenec 2006).

Incubation by the female begins with the penultimate egg, and lasts approximately 14 days. During the nest-building, egg-laying and incubation stages, when a female is off the nest she solicits food from the male with wing-shivering and distinctive, persistent calls, which can be useful for locating breeding birds (Morley 1949; see www.xeno-canto.org/99081 for an example).

The altricial chicks hatch over one or two days, and 97% of eggs hatched successfully in

95 clutches monitored in Cambridgeshire and Oxfordshire. Females brood the nestlings for extensive periods during the first ten days of life, with feeding visits by both parents averaging around 20 per hour (Carpenter 2008). Pin feathers appear on nestlings by four days of age, eyes are opening by the sixth day, and by 11 days they are well feathered and have reached adult weight. By this stage, 91% of nestlings were still alive in the monitored nests that avoided predation or flooding. Fledglings leave the nest at 17–21 days old, and the average of six fledglings per breeding attempt has remained unchanged since the 1960s (Baillie *et al.* 2014).

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9. A brood of nine ten-day-old Marsh Tits in a nestbox in Cambridgeshire, May 2011. Nestboxes allow easier monitoring and ringing of nestlings, although uptake is generally low. This small design mimics natural cavities and was trialled with limited success.

Breeding success

British Marsh Tits have the lowest rate of nest failure recorded in Europe, at 15–18% for both natural cavities and nestboxes, and there is no evidence of a decline in breeding success (Siriwardena 2006; Broughton *et al.* 2011). This compares with failure rates in natural holes of 26% in Poland's Białowieża Forest (Wesołowski & Tomiałojć 2005), 17–25% in Sweden, Switzerland and the Russian Baltic, and 55% in Germany (Ludescher 1973; Nilsson 1984; Markovets & Visotsky 1993; Amann 2003).

Predation is the main cause of nest failure in all studies, and in England the major culprits are Weasels *Mustela nivalis* and Great Spotted Woodpeckers *Dendrocopos major* (Dunn 1977; Broughton *et al.* 2011). Weasels can climb to most nests and will kill sitting females inside as well as taking eggs and young, despite defensive displays and even attacks by the Marsh Tits (Broughton 2005, 2012b). Great Spotted Woodpeckers can break open most nests to eat eggs or chicks.

A fifth of nest failures in Cambridgeshire were caused by the disappearance of the female away from the nest (Broughton *et al.* 2011). The most likely reason for this is Eurasian Sparrowhawk *Accipiter nisus* predation, as this species is the key predator of nesting tits (Geer 1978). Only female Marsh Tits brood the young, so unfeathered chicks will chill and die within hours after a female is killed, even if the male continues to bring food. If the male is killed, however, then a female is capable of raising a brood on her own (Broughton *et al.* 2011).

Nest abandonment by both adults was recorded just once in 202 breeding attempts in Cambridgeshire, in the exceptionally wet spring of 2012 when food was presumably scarce. Rain was also a direct cause of 8% of failures by running into cavities and soaking the nest (Broughton *et al.* 2011). In Białowieża such soaking/flooding is the second-most common cause of nest failure, killing up to 10% of broods in some years (Wesołowski *et al.* 2002).

Marsh Tits are single-brooded, but if a nest is lost during the early stages of incubation, a replacement clutch may be laid in another nest hole. However, in Cambridgeshire only 13% of failures when both adults survived were followed by a second attempt, and so loss of a nest usually means a total breeding failure for that year (Broughton *et al.* 2011).

Post-fledging and juvenile dispersal

From late May or early June fledglings can be heard begging in the tree canopy (Broughton 2009; see www.xeno-canto.org/178691 for an example). The family remains in the vicinity of the nest initially, but in Cambridgeshire some families had left the territory and travelled up to 400 m within five days of fledging.

Fledglings become self-sufficient approximately 8–15 days after leaving the nest, when family break-up occurs (Nilsson & Smith 1985; Broughton *et al.* 2010). Juvenile dispersal is the largest movement that most individuals undertake in their lifetime, and plays a critical role in maintaining populations. Dispersal can also be extremely rapid: one day juveniles may be together in the family group and the next they can be widely scattered and establishing new home ranges (Morley 1953; Amman 1997; pers. obs.).

Dispersal has effectively ended for most juveniles by late June, although some may travel further in autumn after the post-juvenile moult. Females typically disperse furthest, possibly as a strategy to avoid inbreeding, but median dispersal distances in Cambridgeshire were just 1.1 km for females and 0.7 km for males (Broughton *et al.* 2010). The largest movement in this study was 10.5 km, but only 2% of juveniles dispersed more than 5 km. Nationally, only 4% of ringing recoveries have involved distances greater than 10 km, the furthest being 79 km (Wernham *et al.* 2002). These limited dispersal distances are characteristic of Marsh Tits across their range, with medians of 0.5–1.7 km recorded in Sweden, Germany, Switzerland and Poland (Białowieża), and maxima of 1–22 km (Berndt & Winkel 1987; Nilsson 1989; Amann 1997; Wesołowski in press).

Hedgerows and lines of trees bordering fields and roads are vital corridors between woods that facilitate dispersal and the connectivity of populations, as Marsh Tits appear generally unwilling to cross even relatively small gaps in a single flight. For example, Ludescher (1973) recorded maximum flights of only 80 m across open space, and we recorded a maximum flight of just 91 m during radio-tracking in Cambridgeshire. We also observed a colour-ringed bird crossing a gap of 133 m during active dispersal, with circumstantial evidence of two others crossing 250 m of open ground. However, another dispersing juvenile tried to cross a 416-m gap between two woods, but on three occasions it was observed to fly approximately 100 m into the open before aborting and returning to the original wood.

Some related species show a similar aversion to crossing open ground. In Ohio, the maximum gap crossed by dispersing Carolina Chickadees *P. carolinensis* was generally just under 100 m (Grubb & Doherty 1999), and in Canada the probability of Black-capped Chickadees *P. atricapillus* crossing a gap of 200 m was only 20% (St Clair *et al.* 1998). Habitat connectivity is clearly critical for these species and, for the Marsh Tit at least, gaps greater than 100–200 m represent a barrier to movement.

Although hedgerows give dispersing juveniles an exit route from their natal woods, in landscapes where woodland patches are widely scattered, birds may struggle to find a connecting route between them. In Cambridgeshire, less than a quarter of known surviving juveniles had dispersed between different woods, and only 5% reached woods just 2–3 km away, even when vacant territories were available (Broughton *et al.* 2010). In two large areas of woodland 3 km apart, we ringed 951 birds (including 567 nestlings) but only two individuals were ever recorded moving between them. This limited dispersal ability, combined with large territory requirements, helps to explain why small, isolated woods are less likely to be occupied: the fewer territories a wood can hold, the more likely it is that a juvenile will leave to find a vacant place to settle. But the further away a vacancy is, then the less chance a juvenile has of being able to reach it (Broughton 2012a).

Settling and social dominance

Social dominance in Marsh Tits is determined by prior occupancy, whereby juveniles that are first to disperse and settle in a vacant home range are dominant over all later arrivals. This means that settling success is heavily biased in favour of juveniles from early nests (Nilsson & Smith 1988; Alderman *et al.* 2011). This helps to explain the synchronised breeding and infrequent replacement of lost clutches, since fledglings from late nests have little chance of settling and entering the breeding population.

Survival and recruitment

In the Cambridgeshire study, 10% of fledglings survived to establish a territory the following spring (Broughton *et al.* 2010), which is broadly similar to the situation in Sweden and Switzerland (Nilsson & Smith

1988; Amann 1997). Adult survival was also similar among these populations and in Poland's Białowieża Forest, with approximately half the birds surviving from one breeding season to the next (Smith 1993; Schaub & Amann 2001; T. Wesołowski pers. comm.; our data). Marsh Tits commonly reach five years of age, and birds have survived for eight years in Cambridgeshire, nine years in Białowieża, and at least 11 years in Cumbria and Sussex (Robinson & Clark 2013; K. Hindmarch pers. comm.; Wesołowski in press).

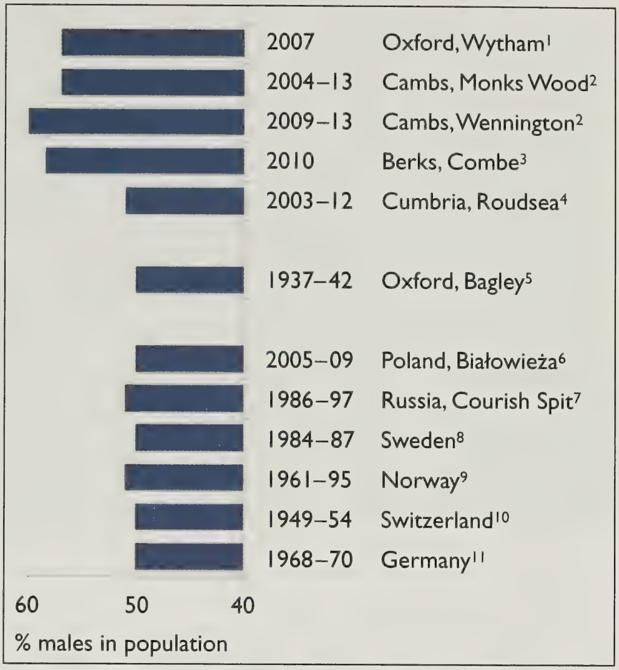

Fig. 2. Average percentage of male Marsh Tits *Poecile palustris* in spring populations, determined from territory mapping of ringed birds, or from biometrics of ringed samples based on Broughton *et al.* (2008). A male-skewed gender bias is evident in British populations in recent years, which was not apparent in Bagley Wood (Oxford) in 1937–42, prior to the national decline, nor in studies from elsewhere in Europe.
Sources: 1 Carpenter (2008); 2 CEH data; 3 CEH/Newbury Ringing Group; 4 K. Hindmarch pers. comm.; 5 Southern & Morley (1950); 6 T. Wesołowski pers. comm.; 7 Markovets & Visotsky (1993), M. Markovets pers. comm.; 8 Nilsson & Smith (1988), J-Å. Nilsson pers. comm.; 9 Haftorn (1997); 10 Amann (2003); 11 Ludescher (1973).

Insufficient numbers of Marsh Tits are ringed in Britain for reliable estimates of national survival trends, although Siriwardena (2006) detected reduced survival among a sample of 25 ring-recovery records over the period 1965–2000. Nevertheless, where Marsh Tits are declining, survival and/or recruitment must be below that required to sustain the local population. A recently discovered male bias in British populations may be a symptom of this (fig. 2), with a lack of females resulting in territories being occupied by unpaired males that are unable to breed. Such a gender imbalance is virtually unknown elsewhere, most notably in the stable population in the Białowieża Forest, but also in Bagley Wood during the 1940s, before the population decline in Britain. This suggests that female survival and recruitment may be a particular issue in the modern British landscape. In species with female-biased dispersal, such as the Marsh Tit, unpaired males are a symptom of increased habitat fragmentation, as female dispersal becomes less successful when gaps widen between increasingly isolated woods (Dale 2001).

Evidence for a disproportionate impact of habitat fragmentation on female Marsh Tits comes from a comparison of settling patterns in Poland's extensive Białowieża Forest and the scattered woods of Cambridgeshire. In both areas males disperse over distances representing just a few territories, but females in Białowieża disperse much further than those in Cambridgeshire, crossing twice as many territories before settling (Wesołowski in press). Since females in Białowieża can disperse in any direction through continuous forest, they can easily reach more distant territory vacancies to achieve full recruitment. In contrast, dispersing females in Cambridgeshire are constrained within small woodland patches; to disperse further than the males they must often leave their natal wood and navigate a successful route to another patch of habitat, a journey through areas where food may be scarce and exposure to predators increased. The apparent result is that some territories are settled only by the short-dispersal males, and do not receive incoming females from further afield, leading to a gender imbalance.

Causes of the Marsh Tit's decline

Fuller *et al.* (2005) reviewed potential causes of the woodland bird declines in Britain, including habitat fragmentation, climate change, increases in nest predation and interspecific competition, and reductions in insect prey and woodland habitat quality. These hypotheses have since been reassessed for the Marsh Tit in studies by Siriwardena (2006), Carpenter (2008) and Broughton (2012a), allowing ideas to be refined as more information became available. Untangling the causes of the Marsh Tit's decline has proved complex, and there is still no definitive conclusion, yet the picture is now clearer and some potential factors can be discounted.

First among the unlikely causes is climate change, for which Carpenter (2008) modelled little impact on Marsh Tits up to the 2020s, although this may become more important in the future. Carpenter also discounted a reduction in insect prey as a driver of the Marsh Tit's decline, with strong circumstantial evidence. Most compelling is the stable breeding success of Marsh Tits, with no recent increase in chick starvation (Baillie *et al.* 2014). Furthermore, despite a 40% decline in macro-moth abundance since the 1960s in southern Britain, Marsh Tits remain relatively widespread there, while there has been no such decline in macro moths in northern England, where the Marsh Tit's decline has been severe (Fox *et al.* 2013). Moreover, the populations of other woodland birds that rely on caterpillars, including Nuthatch *Sitta europaea*, Blue, Great, Coal and Long-tailed Tits *Aegithalos caudatus*, have actually increased (Baillie *et al.* 2014). It thus seems unlikely that changes in insect populations have been a particular problem for Marsh Tits. The most important remaining hypotheses to explain the species' decline are discussed below.

Woodland habitat change

Degradation of woodland habitat quality, owing to reduced management or increased browsing by deer, has been considered a plausible theory that might account for the Marsh Tit's decline (Fuller *et al.* 2005; Carpenter 2008). However, studies of habitat selection and changes in British woodlands have since found no evidence for this. Instead, the general trend of increasing woodland area,

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10. Bagley Wood, near Oxford, November 2013. This was the site of the first detailed study of Marsh Tit ecology, in 1937–42 (Southern & Morley 1950; Morley 1953). This part of the wood remains much the same, with large (30–35 m) mature Pedunculate Oaks *Quercus robur* providing a multi-layered tree canopy above a patchy understorey of Hazel *Corylus avellana* and hawthorn *Crataegus*, with a field layer of Bracken *Pteridium aquilinum*. However, the number of Marsh Tit territories in 2014 was half that found in the 1940s.

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11. Marsh Tit habitat in unmanaged oak *Quercus*, ash *Fraxinus*, hazel *Corylus* and hawthorn *Crataegus* woodland at Monks Wood, Cambridgeshire, May 2013. An understorey shrub layer some 1–8 m tall sits beneath a 25-m tree canopy that is just coming into leaf. Marsh Tits show a strong preference for the structural complexity created by these different layers of vegetation.

and maturation of existing woodlands, has more likely benefited Marsh Tits, as the important habitat features of a mature tree canopy and understorey density have increased or remained stable across the species' range (Kirby *et al.* 2005; Amar *et al.* 2006; Broughton 2012a). Furthermore, in a large-scale analysis, Newson *et al.* (2012) found no relationship between the abundance of Marsh Tits and deer, and it now seems unlikely that habitat quality has deteriorated significantly.

As early as the 1940s only 21% of broadleaved woodland was being coppiced in Britain, declining to just 4% in the 1960s (Hopkins & Kirby 2007), so the loss of coppicing would have had little impact on Marsh Tits during the recent decline. However, a future woodland policy of widespread coppicing for woodfuel or conservation purposes (Forestry Commission England 2007) could have a negative impact on remaining populations by reversing the process of woodland maturation that apparently favours Marsh Tits (Broughton 2012a). At Monks Wood, for example, Marsh Tits avoided a 7-ha block of coppice management that was felled on a 15–30 year rotation. Instead, breeding territories were located only in the surrounding mature woodland, which had been unmanaged for 90 years (Broughton *et al.* 2012b). In Suffolk, much of the 72-ha Bradfield Woods has been coppiced for centuries, and a 2014 survey located ten occupied Marsh Tit territories. However, this density was 26% lower than in the similar-sized, mostly unmanaged Wennington Wood in neighbouring Cambridgeshire (our data). Nonetheless, Bradfield shows that Marsh Tits can exist in coppiced woods, at least those which are relatively large and retain plenty of mature trees. Birds in smaller woods may be more vulnerable to the loss of mature vegetation, such as in Cambridgeshire's 28-ha Upton Wood, where large-scale thinning and coppicing in 2012/13 coincided with a halving of the Marsh Tit population from an average of four territories to just two (our data).

Woodland connectivity

The species' dispersal ecology (above) and the level of unpaired males in British populations (fig. 2) suggest that declining woodland connectivity may be more important than woodland management in explaining the Marsh Tit's decline. A 28% loss of hedgerows in England and Wales between 1969 and 1990 (Barr *et al.* 1993; Barr & Parr 1994) must have affected the ability of juveniles to disperse between woods and find territories and breeding partners. The Marsh Tit's range contraction has been most severe in regions of low woodland cover, where loss of hedgerows would have had the greatest impact on woodland isolation and dispersal (Broughton *et al.* 2013). It is difficult to test the relationship between hedgerow loss and the Marsh Tit's decline directly, since there are no time-series data for hedgerow removal to match the bird atlas data, but this is a plausible mechanism to explain the observed gender imbalance and truncated dispersal distances (Broughton 2012a).

Nest failure

There is no evidence of an increase in nest predation or nest-site competition playing a role in the population decline, since breeding success remains high at a local and national scale (Siriwardena 2006; Broughton *et al.* 2011). However, the presence of unpaired birds that were unable to breed, or predation of paired birds prior to nest-building or egg-laying would not be detected by nest monitoring; breeding success could remain high while the proportion of territories containing nests declined. In Cambridgeshire, for example, the proportion of occupied territories not containing nests was a significant factor limiting the population's productivity (Broughton *et al.* 2011). This switches attention from causes of nest failure to causes of birds failing to nest in occupied territories, such as predation.

Predation

Predators observed attacking full-grown Marsh Tits in Cambridgeshire included Common Kestrel *Falco tinnunculus* and Eurasian Jay *Garrulus glandarius*, and Marsh Tit colour-rings were found in a Tawny Owl *Strix aluco* nestbox. However, most observed attacks were by Sparrowhawks, and paired Marsh Tits that disappeared in early spring were generally presumed to have been taken by this species (Broughton *et al.* 2011). It was shown that Sparrowhawks might remove up to 20–25% of adult Blue and Great Tits at Wytham Woods during spring, yet this had little effect on those breeding populations as losses were replaced quickly (Geer 1978; McCleery & Perrins 1991). In contrast, spring losses of Marsh Tits in Cambridgeshire were often not replaced until after the breeding season, owing to the low density of birds and limited immigration (Broughton 2012a).

Siriwardena (2006) suggested that the rapid recovery of the Sparrowhawk population since the 1970s could have increased predation pressure on Marsh Tits, as the increase in the predator coincided with the decline of the potential prey (Baillie *et al.* 2014). Yet populations of Blue, Great and Coal Tits have all increased over the same period, so predation alone cannot explain the Marsh Tit's decline (Baillie *et al.* 2014). At most, predation may be interacting with other causal factors, but this needs further work.

Inter-specific competition

While the Marsh Tit has declined almost continuously since 1967, the abundance of Blue and Great Tits has increased by a respective 37% and 110% (1967–2011; Baillie *et al.* 2014), and this also suggests a possible link. Compared with Białowieża, where all three species co-exist under 'natural conditions', British woods typically have substantially higher breeding densities of Blue and Great Tits (Amar *et al.* 2006; Wesołowski *et al.* 2010). Because the diet and foraging niche of the Marsh Tit overlaps significantly with that of both species, to which it is subordinate (Gibb 1954; Betts 1955; Carpenter 2008), increasing numbers of Blue and Great Tits could be out-competing and displacing Marsh Tits from their niche, or simply consuming more of the limited food resources in winter.

Carpenter (2008) found that Marsh Tits used oak trees less where the density of Blue and Great Tits was relatively high, spending more time being vigilant instead of foraging, perhaps wary of supplanting attacks by the other tits. Great Tits are the most frequent attackers and food robbers of Marsh Tits (Hinde 1952), and as early as the 1950s Betts (1955) questioned whether competition was limiting Marsh Tit numbers in the Forest of Dean.

Evidence against the hypothesis of inter-specific competition comes from two studies of national sampling data, which found a broad positive association between the abundance of Marsh, Blue and Great Tits in the breeding season (Siriwardena 2006; Carpenter *et al.* 2010). These suggested that good years and good sites for the dominant tits were also good for Marsh Tits, although this could mask a competition effect if Marsh Tits increased less than other tits in the good years and declined more in the bad years.

In contrast, results from the detailed demographic study in Cambridgeshire show a negative correlation between the productivity of Blue and Great Tits and the survival of Marsh Tits the following year (fig. 3). This suggests that a greater density of competitors during autumn and winter could be related to increased mortality of Marsh Tits. This would increase the need for immigration, which has in turn become more difficult as woodland connectivity has decreased. Research into this finding is ongoing, but if this reflects the situation in Britain more widely then the gender imbalance among British Marsh Tits may also be evidence of inter-specific competition. Females are lowest in the social hierarchy and so may face greatest competition from dominant tits of their own and other species, which could increase mortality (Broughton 2012a). This would be exacerbated by the greater risks faced by females during dispersal, creating an interaction between increased inter-specific competition and reduced woodland connectivity. Investigation of these factors for age and sex classes at a range of spatial scales is now a primary focus of our research into the Marsh Tit's decline.

Conservation of Marsh Tits

The Marsh Tit has undergone a deep and protracted decline for almost half a century, with no sign of a recovery. As with other species, the reasons for this decline are complex and still not fully understood, so it is difficult to identify clear measures for a recovery. Nonetheless, an improving understanding of the species' requirements highlights actions that are likely to help remaining populations.

Crucial factors in the occupation of a wood by Marsh Tits are its size, maturity and proximity to other populations. Expanding woodland cover should help to secure and link existing populations. Marsh Tits are likely to benefit if woods are allowed to mature to a natural climax stage, but this may conflict with other conservation objectives – notably where coppice management has been encouraged to help other declining species, such as the Common Nightingale (Holt *et al.* 2012). A regional-scale strategy may be required to ensure that the needs of all species are met, or important populations are given conservation priority.

Improving woodland connectivity by conserving and planting hedgerows would have clear benefits for Marsh Tits, by facilitating successful dispersal. Local measures could include linking woods by closing gaps greater than 100 m with new hedgerows or 'stepping stone' patches of shrubs and trees.

Marsh Tits are typically not limited by nest sites, so provision of nestboxes does little to help them (Broughton & Hinsley in press). Furthermore, large numbers of tit nestboxes in woodlands may increase the local populations of Blue and Great Tits, so this may be best avoided until we know more about the role of inter-specific competition.

The poor dispersal ability of Marsh Tits means that recolonisation of or expansion into woodlands outside of the current range may be a slow and difficult process. Where open landscapes separate suitable habitat from existing populations, as in parts of Lincolnshire and lowland Scotland, then assisted colonisation through translocations may be considered as a future conservation tool. An official translocation project involving tits has never before been attempted, but the sedentary behaviour of the Marsh Tit and established monitoring

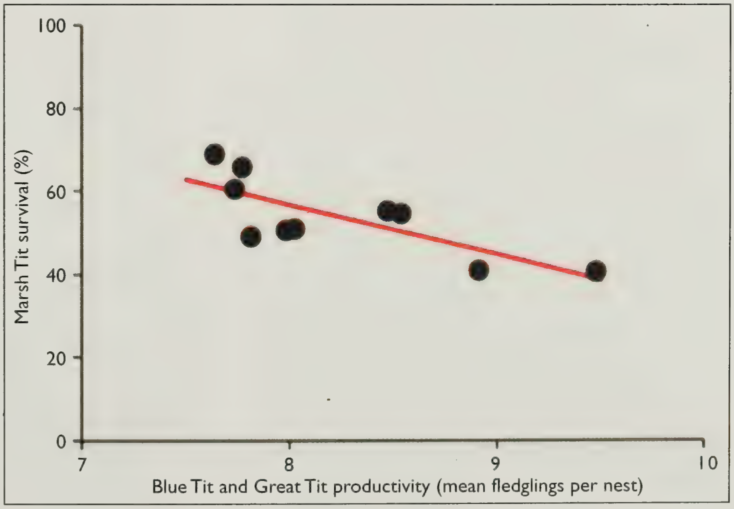

Fig. 3. The negative correlation between the productivity of Blue *Cyanistes caeruleus* and Great Tits *Parus major* and the survival rate of adult Marsh Tits *Poecile palustris* in the subsequent year ($r = -0.76, P = 0.01$ using arcsine transformed survival data). Data is from an annual mean of 74 Blue and Great Tit nests in nine Cambridgeshire woods, and an annual mean of 56 individual Marsh Tits in five woods within the same region, over ten years. A best-fit trend line on the raw data is shown in red.

techniques could make it a good candidate.

Conclusions

Understanding the Marsh Tit's decline poses a significant challenge and some difficult questions. Woodland habitat appears to be increasing and improving while the Marsh Tit population continues to decrease steadily, pointing to wider and more complex issues. Research into the decline is now focusing on factors affecting survival and recruitment as the leading hypotheses, including inter-specific competition, the compounding effects of predation, and barriers to dispersal. These factors could be interacting to create multiple pressures on Marsh Tits at different points in the annual cycle, but further work is needed to fully understand their significance.

It is becoming clear that the declines of different woodland birds do not have a single underlying cause, and that a particular combination of pressures is probably affecting each species. This may put conservation measures aimed at one species into conflict with those for another, so a strategic landscape approach may be required to balance the needs of different species.

Further difficulties arise if serious negative impacts of inter-specific competition or predation are substantiated, as these would be difficult to address. Improving woodland connectivity should be easier to tackle, with agri-environmental schemes and charities already providing incentives for hedgerow creation and tree-planting.

The plight of the Willow Tit in Britain shows how bad things could yet become for its closest relative. Thirty years ago the Willow Tit was just as widespread as the Marsh Tit and almost as abundant, but it is now rarer than the Rose-ringed Parakeet *Psittacula krameri* and under serious threat (Musgrove *et al.* 2013; Last & Burgess 2015). With no sign of a recovery, the Marsh Tit may yet follow suit and be lost from parts of England and Wales, and from Scotland completely. Such a situation calls for a proactive and precautionary approach to conserving remaining populations.

Acknowledgments

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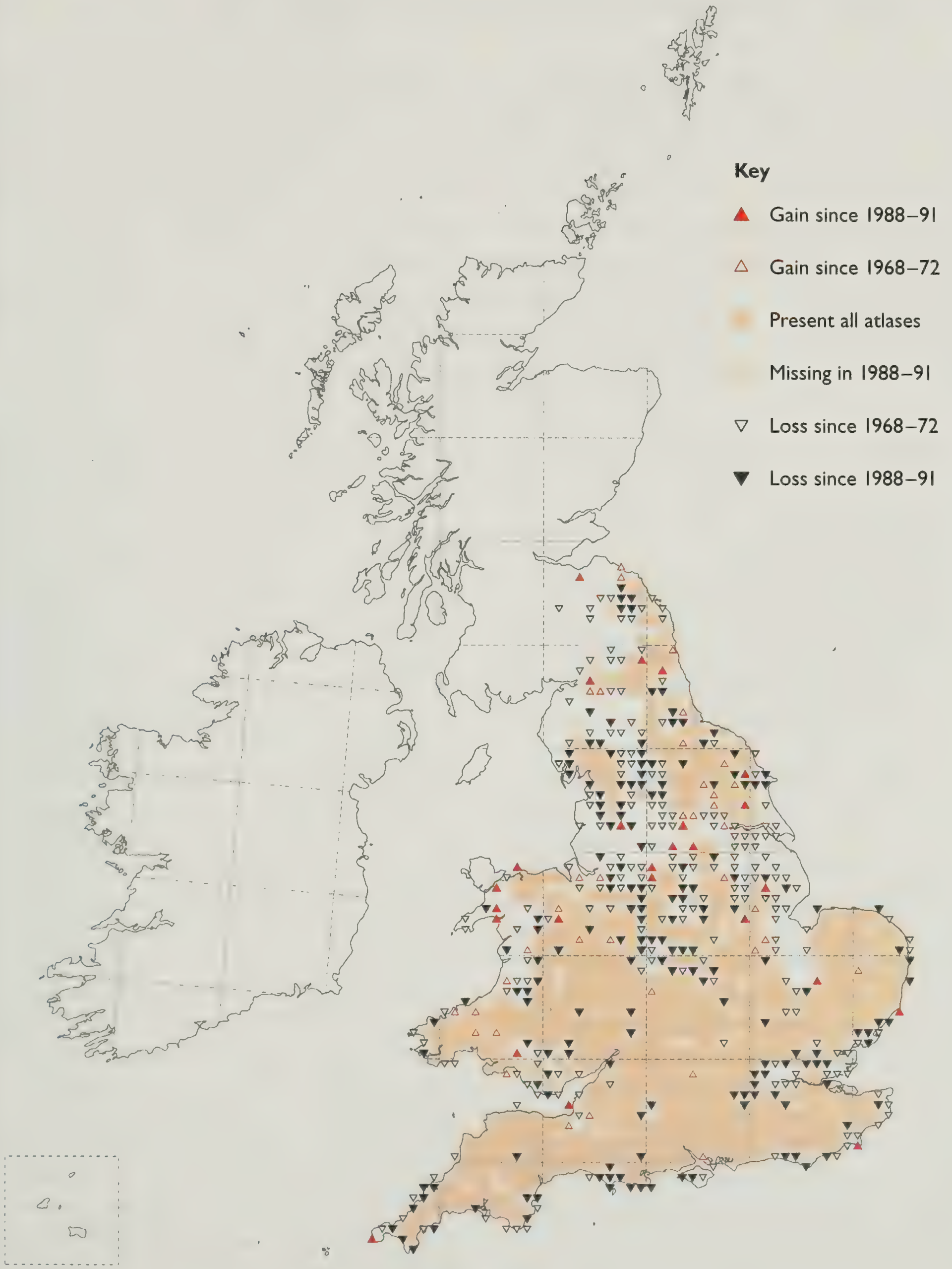
Appendix 1. Breeding distribution change of the Marsh Tit *Poecile palustris* in the UK, between the national atlases of 1968–72 and 2007–11.



Distribution map from *Bird Atlas 2007–11*, a joint project between BTO, BirdWatch Ireland and the Scottish Ornithologists' Club. Maps reproduced with permission from the BTO. The map shows gains and losses since the 1968–72 atlases: solid triangles denote recent gains/losses (since the 1988–91 atlas), while open triangles show older gains/losses (already apparent in 1988–91). Overall there were gains in 62 squares and losses in 369 squares during the time period mapped.

Short papers

Nestboxes and fieldcraft for monitoring Willow Tits

Abstract Our understanding of the reasons for the serious decline of the Willow Tit *Poecile montana* in Britain is constrained by an incomplete knowledge of the species' ecology and demography, which is partly due to the difficulty of persuading Willow Tits to use nestboxes. This paper documents a study in Wiltshire in which Willow Tits have bred in nestboxes since 2006. The nestbox design developed is now used by the majority of territorial pairs in the study area. Nest success from nests in boxes that reach the egg stage is very high, probably much higher than that in natural cavities. A recent programme of habitat creation specifically for Willow Tits is described, and shows some indications of success.

In Britain, the Willow Tit *Poecile montana* is in serious, long-term decline. Its population decreased by 94% from 1970 to 2012 (and by 83% from 1995 to 2012; Hayhow *et al.* 2014), while the breeding range has halved, from 1,200 occupied 10-km squares in the 1988–91 breeding atlas to just 558 in *Bird Atlas 2007–11* (Balmer *et al.* 2013). The species' distribution is now highly fragmented and within its remaining range population density is almost certainly very low. The potential causes for this decline are still poorly understood and research carried out in the 2000s, while establishing habitat preferences and apparently ruling out some hypothesised causes, failed to establish the mechanisms involved. We still have a poor knowledge of the ecology of British Willow Tits *P. m. kleinschmidti*, which show subtle differences in habitat and ecology from better-studied and more widespread populations in continental Europe.

Earlier research by the RSPB and the University of Nottingham was summarised by Lewis *et al.* (2009a). This work indicated that Willow Tits seem to prefer wetter woodlands (Siriwardena 2004; Lewis *et al.* 2007, 2009b), although this association was based on correlations and the potential mechanisms that explain this preference remain unknown. Perhaps damp woodland provides more key food resources, or more of the preferred tree species used for foraging or nesting in; or perhaps periodic incursions of standing water help to create the right kind of standing deadwood required for nesting. Although Willow Tits are commonly usurped from nest sites by other tit species, there is no evidence to suggest that increasing Blue Tit *Cyanistes caeruleus* or Great Tit *Parus major* populations have contributed to the Willow Tit's decline through greater competition (Siriwardena 2004; Lewis *et al.* 2007), although localised conflicts have been reported (Maxwell 2002). Nor is there any evidence that the main nest predator, the Great Spotted Woodpecker *Dendrocopos major*, is any more common in woodlands that were formerly occupied by Willow Tits than those which are currently occupied (Siriwardena 2004; Lewis *et al.* 2007). There is some evidence (again based on correlation) that increases in Roe Deer *Capreolus capreolus* populations have a negative effect on woodland occupancy by Willow Tits (Newson *et al.* 2012). Browsing by low densities of deer may help to maintain the young, scrubby woodland that Willow Tits prefer, whereas higher densities may result in over-browsing of low vegetation, making the woodland less suitable. However, there has been an increase in the sub-canopy layer of woodlands in nearly all regions of Britain since the 1980s (Amar *et al.* 2010), which suggests no shortage of suitable habitat, although fragmentation has an important bearing on its accessibility to Willow Tits.

One potential cause of the Willow Tit's decline is provided by data from the BTO/JNCC/RSPB Breeding Bird Survey and from Constant Effort Site ringing, which suggest both a decline in productivity and a lower adult survival rate in recent decades

(Baillie *et al.* 2014). Whatever the reasons, the British Willow Tit is in serious trouble because remaining populations are now so fragmented that recolonisation of suitable areas is increasingly unlikely because of the species' very limited dispersal capacity. Natal dispersal distances are typically only 1–2 km and rarely more than 10 km (Hogstad 1990), so in landscapes with fragmented and unconnected habitat, dispersing young may have an increasing lack of suitable options, and as local populations die out sites are unlikely to be recolonised.

It is clear that there is still much to learn about Willow Tit ecology before effective conservation action is possible. One important gap in our knowledge is a lack of information on demographic and reproductive trends, which can be obtained from nest monitoring. For many hole-nesting birds such information is readily obtained through monitoring nests in nestboxes. Nestboxes are more predator-resistant than natural cavities, which can increase nest success. The ease of siting and monitoring a good sample of nestboxes makes them a popular monitoring tool for other tit species, but Willow Tits do not take readily to nestboxes, while the fact that they occur at much lower densities than other species also makes them less convenient to study. Willow Tits are obligate excavators, digging their own nest holes in soft, rotting wood. Earlier work found no shortage of the availability of dead wood in formerly occupied Willow Tit woodlands (Lewis 2007), which suggests that there is no obvious shortage of natural sites and that simply providing nestboxes is unlikely to be successful. However, with some time and effort, it is possible to coax territorial pairs into specially designed nestboxes. This has been achieved successfully over the past ten years at our study site, on a private estate at the edge of Savernake Forest, in Wiltshire. Here we describe this work, including how to survey for and determine the presence of Willow Tit territories; the nestbox design that has been used successfully; the process of getting Willow Tits to use nestboxes; monitoring results to date; and some encouraging early results from habitat creation work.

Willow Tit ecology

In Britain, Willow Tits are found primarily in scrub-type habitats dominated by willow *Salix*, Birch *Betula pendula* and Hawthorn *Crataegus monogyna*. Many remaining strongholds occur on former industrial sites with regenerating woodland, particularly in the midlands and northwest England. Within occupied sites, Willow Tits are most likely to occur in areas with a dense understorey, 2–4 m high, scattered mature trees and with a plentiful availability of dead wood, while nests are typically found less than 1.5 m from the ground and in a small dead trunk (Lewis *et al.* 2009a,b; Stewart 2010).

Willow Tits are sedentary, remaining in their territory year-round (Cramp & Perrins 1993). Typically for *Poecile* species, the territory is relatively large, although little is known about territory size or home-range requirements in Britain. Continental Willow Tits have a winter home range of around 13 ha on average (range 2–34 ha; Siffczyk *et al.* 2003), and the winter home range is typically much larger than the breeding territory.

Young are dependent on their parents for 7–11 days after fledging, and remain in a loose family group in the natal territory for a further 1–2 weeks (Haftorn 1997; Lewis *et al.* 2009a). After dispersal from the natal territory, juveniles wander for several weeks before settling on winter territories, which they select within six weeks of fledging during late July to early September (Hogstad 1990; Haftorn 1997, 1999). During winter, juveniles range more widely than adults, visiting neighbouring territories to look for opportunities for future breeding territories (Hogstad 1999).

Surveying Willow Tits

Owing to the species' poor dispersal ability, it is crucial that potential Willow Tit nestbox schemes are located in areas that are close to or already contain existing populations. Nestboxes provided more than a few kilometres from a remaining population are extremely unlikely to become occupied.

Surveying potential habitat in late winter and early spring (between February and the end of March) should soon establish whether Willow Tits are present. A suggested protocol requires two visits at least two weeks apart and the use of playback. Maps of survey sites are overlaid with a 200-m grid and at every intersection a mixed recording of Willow Tit call and song is played for two minutes. A further two minutes are then spent listening for a response. If a response is obtained during playing, the recording is turned off. For narrow or linear sites this method can be adapted by playing the recording as above every 200 m along the site. Surveys on days with little wind and which are relatively warm for that time of year are more reliable in determining presence. If Willow Tits are present, they are usually very responsive to the recording.

Nestbox design

Many different nestbox designs have been tried in the past but a successful design has proved elusive. Jimmy Maxwell had success with a bark-covered plastic tube filled with wood shavings and damp sawdust in the Clyde Valley, and his success provided the inspiration for this study (Maxwell 1999). We tried several designs in the early 2000s, including a standard nestbox with 25-mm diameter entrance filled with polystyrene blocks (polystyrene seems ideal as it has a soft consistency similar to dead wood), as well as hollowed-out birch logs filled with wood shavings. But these were never occupied and a totally new design was tried that has been used with good success since (Revill *et al.* 2010). Every effort is made to make the box blend in with its natural surroundings: by making the front much longer than on a traditional tit nestbox, making the 25-mm entrance hole elliptical in shape and often using bark from the same tree species on box fronts and sides (plate 12).

The internal dimensions match the exact dimensions of an excavated Willow Tit nest (from a polystyrene-filled prototype box that was excavated, leaving a template). Nestboxes are designed to be accessible for monitoring, with a secure but removable lid, constructed from 25-mm untreated softwood and filled with wood shavings and damp sawdust; see fig. 1.

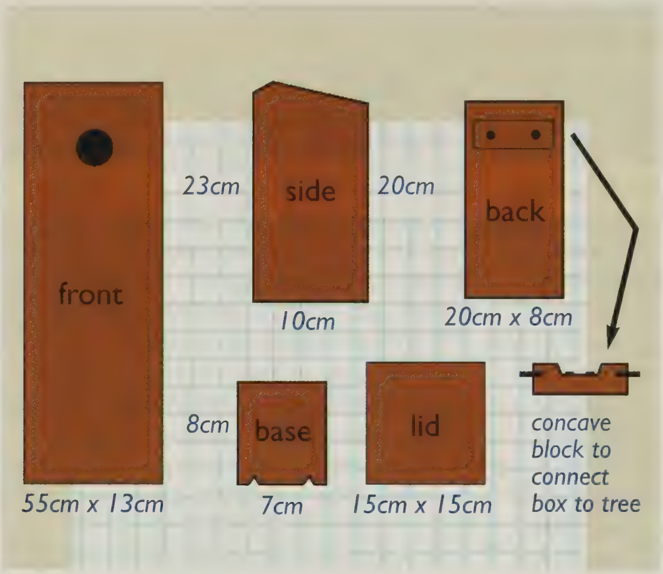
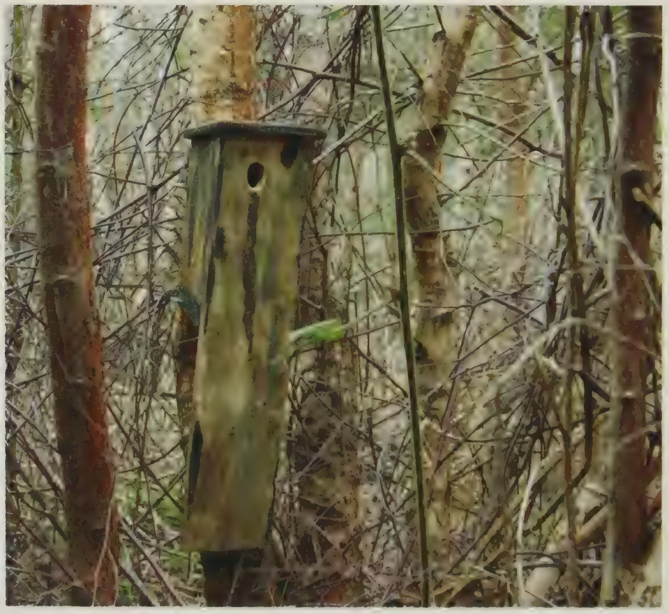


Fig. 1. Willow Tit *Poecile montana* nestbox design, by John Last (repeated from Revill *et al.* 2010).



John Last

12. A Willow Tit *Poecile montana* nestbox in our Wiltshire study area, March 2007.

Nestbox location

Nestboxes are put out within territories during late winter, when established pairs begin inspecting potential nest sites, and are collected in at the end of the breeding season. Providing a good number of nestboxes within territories maximises the chances of occupancy.

Nestboxes are sited in two stages, in early January and in February. In favoured areas, an area where a pair is known to be holding territory or where birds have been seen over a period of time, two or three nestboxes (per territory) are erected in January. These boxes give Willow Tits time to find and get used to them, and also act as a useful way of establishing the likelihood of occupation, since part-excavations can occur in January. If a nestbox has received some excavation or attention, this is recorded and further nestboxes are then sited in the same area in February. Typically, we end up with about five nestboxes per territory.

Nestboxes are usually placed in a line, at a spacing of 40 m apart. If positioned closer together, and another tit species takes over an excavated box, Willow Tits are less likely to occupy the adjacent box. However, spacing the Willow Tit boxes 40 m apart seems to reduce the potential competition from usurpers visiting nearby boxes. Sometimes Willow Tits favour or excavate a box at one end of a line of boxes. When this happens, we add an additional box (often taking it from the other end of the 'line') to provide alternatives in two directions, which may be needed if they are usurped from their chosen box.

Nestboxes are positioned on a tree of similar diameter to the box, about 1.5 m above ground and with the entrance hole facing east to southeast. This aspect means that the entrance is mostly away from the prevailing weather but also that it faces the morning sun, which may warm chicks after a cold night and perhaps enable the female to leave the nest to find food earlier in the day. Later, in the hotter part of the day, the box is more shaded from extremes of temperature. In August, after the breeding season is over, the boxes are taken down, cleaned and stored until the following year.

Monitoring Willow Tit nests

Our study population has been monitored by JL since 1997 and, despite losses elsewhere in the county during this time, it has remained fairly stable since 2006 at 6–8 pairs (although there were up to ten pairs in earlier years, and 2014 was a particularly poor year). The persistence of the population is probably helped by nestbox provision and also by habitat management (see below). Boxes are checked at least weekly from February, firstly to determine possible excavation, and then to monitor any nesting attempts.

Table 1 provides a summary of nests monitored in nestboxes since 2006. It shows that the proportion of territorial pairs using nestboxes is very high; some 63% of all territorial pairs found since 2006 reached the egg-laying

Table 1. Summary of Willow Tit *Poecile montana* monitoring at our Wiltshire study site since 2006. Territories held were determined from playback surveys and observations. Nest monitoring is from nests in nestboxes only. In 2013 an additional four young fledged from a nest in a natural cavity and three other nests have been found in natural cavities since 2006.

	territories	nestboxes provided	nests that reached egg stage	mean clutch size	nests that reached chick stage	nests that fledged young	number fledged	young per nesting attempt
2006	8	35	7	8.1	7	7	52	7.4
2007	9	36	9	7.6	9	9	62	6.9
2008	8	38	7	7.7	7	6	43	6.1
2009	7	36	3	7.7	3	3	23	7.7
2010	7	38	4	8.0	4	4	27	6.8
2011	7	37	3	7.7	3	3	21	7.0
2012	7	36	4	7.5	4	3	22	5.5
2013	6	35	1	8.0	1	1	8	8.0
2014	3	20	1	10.0	1	1	1	1.0

stage in a nestbox – and further pairs are likely to have attempted to nest but been usurped pre-laying. Note that many nestboxes showing signs of excavation are ultimately not used by Willow Tits; this is due to Willow Tits being usurped by other tit species (most commonly Blue Tits, Coal Tits *Periparus ater* or Marsh Tits *Poecile palustris*, but occasionally Great Tits); however, this has occurred only in the period prior to the start of incubation, and thus before adult Willow Tits are present at the nest more or less continuously. Usurped pairs may have sufficient time to excavate a new cavity and breed elsewhere, but may be disadvantaged by a delay in breeding (although if other nest sites are readily available, the delay might be only a few days). Marsh Tits may occasionally excavate an existing nest cavity, so some recorded excavation may have been by Marsh Tits, which also breed in the study area. Of nests that reached the chick stage, only two failed to fledge any young at all – both nests were found with starved young. Productivity has been good, with annual means between 5.5 and 8.0 young per nesting attempt except in 2014, and no nests have been predated. The lack of predation is in part due to the nestboxes being much more resistant than the soft wood of a natural cavity.

Creating habitat for Willow Tits

Our study area, which is a managed, commercial woodland of some 140 ha, confirms that Willow Tits will use such habitat. Much of the site is planted with conifers, predominantly Common Larch *Larix decidua*, Japanese Larch *L. kaempferi*, Norway Spruce *Picea abies*, Corsican Pine *Pinus nigra* and Douglas Fir *Pseudotsuga menziesii*. Deciduous species are found in much smaller quantity among the conifers, mainly Beech *Fagus sylvatica*, Birch and some Goat Willow *Salix caprea*. After mature stands are felled, blocks are replanted the following spring. These young plantations are used by foraging Willow Tits, with use noticeably high about 4–5 years after replanting when the scrub layer is dense, 2–3 m high and characterised by naturally regenerating deciduous trees, such as Birch, emerging from the scrub layer. Conifer blocks are subdivided by rides, which have deciduous trees at the edges, commonly Birch, Hawthorn and Hazel *Corylus avellana*, with a Bramble *Rubus fruticosus* agg. and Honeysuckle *Lonicera periclymenum* scrub layer interspersed with Bracken *Pteridium aquilinum* and various grasses. These rides are well used by Willow Tits for foraging and for moving between areas, and so are valuable as habitat corridors through the conifer blocks. The woodland rides become very wet after rainfall, although the woodland floor itself rarely has standing water.

Once the conifers are about 5 m high, about seven years after planting, they are thinned out. At this time Willow Tits stop using these blocks and spend more time in the woodland margins. Therefore, since 2006 a programme of habitat creation has been gradually implemented in scallop-shaped areas along the margins of the coniferous blocks (plate 14). The aim has been to create diverse stages of young scrub and deciduous tree growth through mechanical clearance, and planting appropriate deciduous trees. In 2006, a 300-m long and 25-m wide strip along a south-facing ride was cleared and 350 Hazel, Birch and Hawthorn saplings planted and protected from browsing animals with tree shelter tubes (plate 15). Subsequently, other, similar-sized areas were cleared in the same way and allowed to regenerate naturally. In addition, some more mature Birch trees were retained in clearings and

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13. A brood of 11 Willow Tit chicks, almost ready to fledge, in a nestbox on our study site, May 2007.

felled to leave a 2-m high stump, the aim being to create decaying stumps suitable for Willow Tit excavation and nesting (plate 16). This type of stump management is widely applied as a biodiversity enhancement measure in commercial forests in continental Europe, where the tree stumps are termed 'high-cut stumps' and provide good habitat for invertebrates, particularly beetles (Jonsell *et al.* 2004). New clearings were created each year until 2012.

Willow Tits were first found regularly using this created habitat from 2009, when nestboxes were provided as described above. In 2010 a pair bred successfully in a nestbox within this recently created habitat, fledging eight young. In 2012 another nestbox was excavated, but ultimately used by Blue Tits. Real success occurred in 2013, however, when a pair of Willow Tits excavated a nest in one of the high-cut Birch stumps, successfully fledging four young. In the same year a second pair also fledged young from a nestbox situated within the created habitat. These are encouraging indications that such habitat manipulation can work, which we hope can be replicated at other sites where Willow Tits persist.

Conclusions

Our work has shown that Willow Tits will use nestboxes, and that nest failure in such boxes is relatively low. It is important to remember that nestboxes will probably be occupied only if situated within existing territories – nestboxes alone are very unlikely to attract Willow Tits into woodlands, even if formerly occupied by them. Extensive observations from late winter are required to site nestboxes correctly, and they need to be filled with material that can be excavated if they are to be used by Willow Tits. Habitat creation within 1–2 km of existing territories may be a useful tool in maintaining local populations and when combined with a successful nestbox scheme can increase nest success and so provide a higher number of potential recruits.

Even with the provision of safer nest sites and habitat creation around existing populations, however, the future for the British Willow Tit does not look good. With such poor dispersal ability and the fragmentation of habitat and distribution, time is running out to find solutions. The RSPB is currently conducting a long-term trial of habitat

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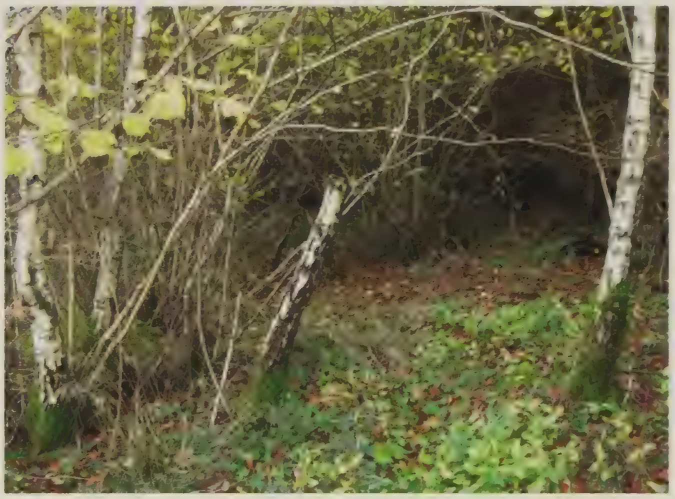
14 & 15. Habitat creation at our Wiltshire study site, November 2014. The aim is to introduce habitat diversity along the margins of coniferous blocks.



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16. A 'high-cut stump' of Birch *Betula pendula*, created with the aim of providing a greater supply of natural nest sites for Willow Tits; Wiltshire, November 2014.

creation and manipulations for Willow Tits at a number of sites, which will hopefully lead to more advice for woodland managers as well as maintain some remaining core populations into the future.

Acknowledgments

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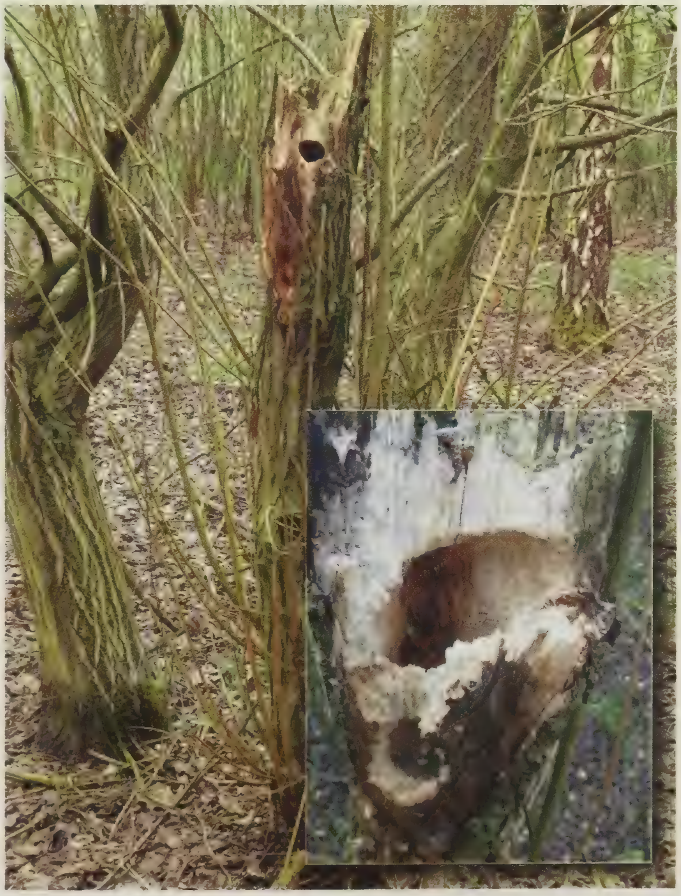
The effects of avian nest predation and competition on the Willow Tit in Britain

Abstract The Willow Tit *Poecile montana* population in Britain is in serious, long-term decline. It is likely that several factors are responsible for this decline, although those related to habitat change or degradation are thought to be among the most important. So far, there is little evidence that nest predation or competition has had a major effect on this species. This paper presents the results from a long-term study of Willow Tit nests in natural sites in northwest England. The results suggest that avian competition, and particularly nest predation, may be important contributory factors in the Willow Tit's decline, at least in some areas of Britain.

The decline of the Willow Tit *Poecile montana* in Britain and its current Red-listed status has been well documented. Data from the Breeding Bird Survey (BBS) show that the species declined by 83% during 1995–2012 (Harris *et al.* 2014), while the decline from 1967 to 2011 based on Common Birds Census/BBS data is measured at 92% (Baillie *et al.* 2014). Habitat-related issues are regarded as the key reasons for the decline (for example, a combination of overgrazing by deer and shading has led to a thinning of the lower vegetation required for feeding; Lewis *et al.* 2009; Newson *et al.* 2012). Other potential factors, summarised in Balmer *et al.* (2013), include competition for nest sites with more dominant tit species (Maxwell 2002, 2003), but the evidence to link the Willow Tit's decline with numbers of avian nest predators is weak (Siriwardena 2004; Lewis *et al.* 2007).

While not wishing to play down the importance of habitat loss and degradation, I contend that avian nest predation and, to a lesser degree, competition for nest sites have played an important contributory role in the continued decline of the Willow Tit. This is based on personal observation of 68 natural nest sites: 66 in Cheshire and two others in Greater



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17. Willow Tit *Poecile montana* nest site and typical habitat in Cheshire (April 2013), with (inset) the same nest in May 2013 showing the extensive damage caused by a Great Spotted Woodpecker *Dendrocopos major*, which then emptied the entire contents of the nest chamber.

Table 1. The outcome of 68 Willow Tit *Poecile montana* nests, all in natural sites, found and monitored between 1969 and 2014 in Cheshire and Greater Manchester. Note that 'clutch' and 'brood' denote minimum number of nests that reached the egg and chick stage respectively. All predation events were by Great Spotted Woodpeckers *Dendrocopos major*. In 1980, 2007 and 2010, single Willow Tit nesting attempts were abandoned after the cavity was taken over by Blue *Cyanistes caeruleus* or Great Tits *Parus major* (shown as 'abandoned'); and in both 2013 and 2014, a nest cavity where Willow Tits were usurped by Blue or Great Tits was subsequently predated by Great Spotted Woodpeckers (shown as 'predated').

year	no. nests	clutch	brood	outcome: predated	outcome: abandoned	outcome: fledged	outcome: unknown
1969	1						1
1980	1				1		
1989	1	1	1			1	
1999	1	1	1			1	
2000	1						1
2001	1	1					1
2002	1	1					1
2003	4	1		1	1		2
2004	1	1	1			1	
2005	3	2	1	1	1	1	
2007	3				3		
2008	1	1	1				1
2009	5	4	4			2	3
2010	11	4	4	4	4	3	
2011	12	6	3	4	2	3	3
2012	7	5	2	2	3	2	
2013	7	5	4	3	1	3	
2014	7	3	2	4	1	1	1
total	**68**	**36**	**24**	**19**	**17**	**18**	**14**

Manchester. While one nest dates back as far as 1969 and two others to 1980 and 1989, the remainder are from the years 1999–2014, when the Willow Tit population was in steep decline (table 1). It was not possible to follow up all of the nests to determine the eventual outcome, and some nests may have been predated after my last visit.

Since the Willow Tit has now become so scarce, with nests often difficult to find, I am not aware of any recent study that has observed a higher number of nests. This note describes my observations and findings.

Competition with other tits

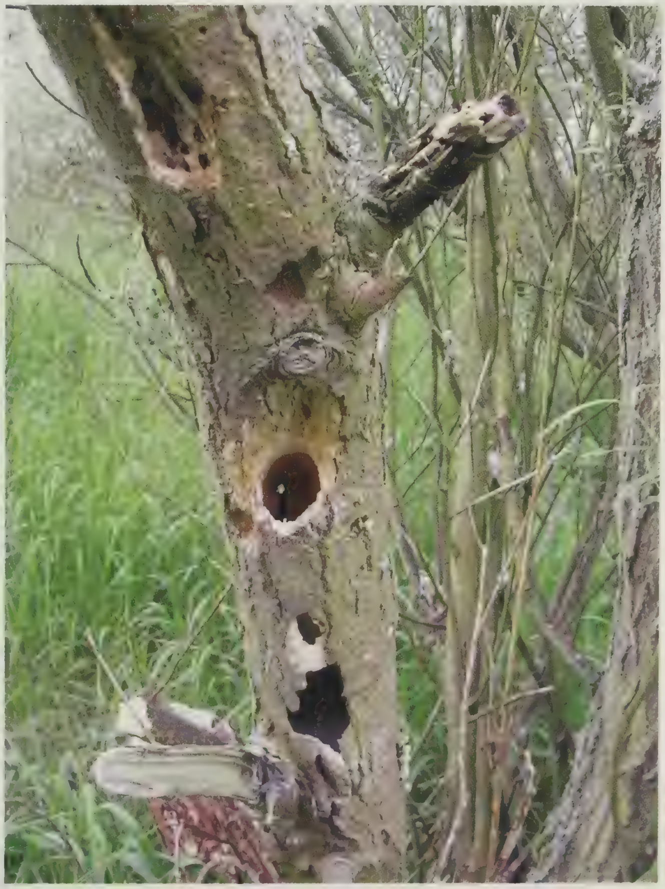
I have encountered excavating Willow Tits receiving unwelcome attention on many occasions from Blue *Cyanistes caeruleus* or Great Tits *Parus major*, which in some cases tried to take over the nest site, but no such interactions with any other species. Even though they do not have the aggressive reputation of the two more common species, Willow Tits are still capable defenders of their nest site. I have watched a Willow Tit and a Blue Tit grappling in combat, claw to claw, beneath the nest tree, and observed a pair of Willow Tits successfully repel an attack on their nest cavity by a pair of Great Tits. On another occasion I noted a fierce battle between two Willow Tits and a pair of Great Tits, which continued for over two hours, but the Willow Tits refused to be evicted. It is often possible to determine whether a nest has been usurped at the building stage by the presence of a quantity of moss in the nest chamber, a material that the Willow Tit rarely uses.

Of the 68 nests I have monitored, at five (7%) the Willow Tits were usurped by Blue or Great Tits. At a further three sites (4%) potential usurpers involved two pairs of Great Tits and a pair of Blue Tits, which were all successfully repelled.

Avian predation

I have encountered Willow Tit nest destruction by only one avian predator, the Great Spotted Woodpecker *Dendrocopos major*, but this has been alarmingly commonplace. The nest cavity can be attacked at all stages of the nesting cycle. Obviously, the most damage is caused at the egg or chick stage, but the chamber is often ripped open and its contents removed prior to nest-building, and even post-fledging. The hallmarks of woodpecker attacks are easily recognised by the large gaping holes drilled into the cavity. Frequently, a woodpecker will rip open the entire chamber, from the nest entrance to the base. Woodpeckers are also adept at drilling into the nest tree exactly level with the nest and extracting the contents through a single hole. Despite this, Willow Tits will often excavate in stumps and limbs that are riddled with woodpecker borings and I have known them to use old or partial woodpecker holes in which to begin their excavations. I even watched an excavating Willow Tit having to pause its cavity preparation as a Great Spotted Woodpecker visited the nest tree and proceeded to drill for food. This particular Willow Tit continued to excavate a large, deep cavity, which was eventually abandoned even though it did not suffer any visible avian interference (I suspect that the bird was an unmated male, because of its persistent singing, but if the nest had later contained eggs or chicks I am confident it would have been predated). It is characteristic for Willow Tits to select decrepit trunks of small diameter for their nests, probably to facilitate easy excavation. By the same token, these are easily broken into and do not provide the protection of the more robust natural cavities used by the other tits. When examining nests, I have often noticed fresh punctures and piercings and, while the cavity has not been seriously damaged, these have undoubtedly been caused by a visiting Great Spot.

Many nest holes can be cunningly hidden, such as at the end of a broken branch, in fallen timber or in a mossy crotch. But most are quite prominent and obvious to the trained human eye and presumably also to woodpeckers. The tits are attracted to newly broken timber limbs, stumps and branches where the excavation is in fresh bright wood that can act as a beacon to feeding woodpeckers. Although it is often thought that Willow Tits are most careful in removing woodchips to a distance, so as not to attract attention, this is certainly not always the case. My observations show that, from the outset of excavation, the birds will just let the chips drop, often leaving a sizeable pile of chippings just below the site and wood dust on the nesting tree, which is easily visible;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18. Hallmarks of Great Spotted Woodpecker *Dendrocopos major* damage to a Willow Tit nest cavity, Cheshire, May 2010. The predator is easily identified by the gaping holes and punctures.

but then as the boring progresses they will fly up to several metres to dispose of the spoil safely. This habit can vary from pair to pair; the birds are also noisy at this stage of the breeding cycle, and this too can draw attention to their activities.

Of the 68 nests monitored, 19 (28%) of the cavities were attacked and seriously damaged by Great Spotted Woodpeckers (note that two of the 19 were attacked after Willow Tits had been evicted by Blue or Great Tits). A small proportion of these attacks may have happened post-fledging, as suggested by the good condition of the remaining nest.

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19. Even those nests inside a deep cavity are vulnerable to predation by Great Spotted Woodpeckers *Dendrocopos major* as they are adept at drilling level with the nest and extracting the contents through a single hole. Willow Tits often choose small-diameter trunks and decrepit stumps as nest sites, which are easily attacked by woodpeckers; Cheshire, May 2012.

Other observations

In my study the most frequently chosen tree species for the nest site was overwhelmingly willow *Salix*; some 52 of 65 (80%) attempts where I recorded the tree species were in willows. Other nests were in Elder *Sambucus nigra* (nine) and Alder *Alnus glutinosa* (two), with two nests in unidentified tree species.

Willow Tits normally excavate their nest chamber at a low elevation, typically between 1.5–2 m from the ground, although nests as high as 8 m have been documented (Campbell & Ferguson-Lees 1972). I recorded the height above ground of 59 of my nests as follows: up to 1.5 m – 24 (40%); 1.5–2.0 m – 17 (29%); above 2.0 m – 18 (31%). It is interesting to note such a high proportion of sites over 2 m and the highest nests I have found have been at around 4 m.

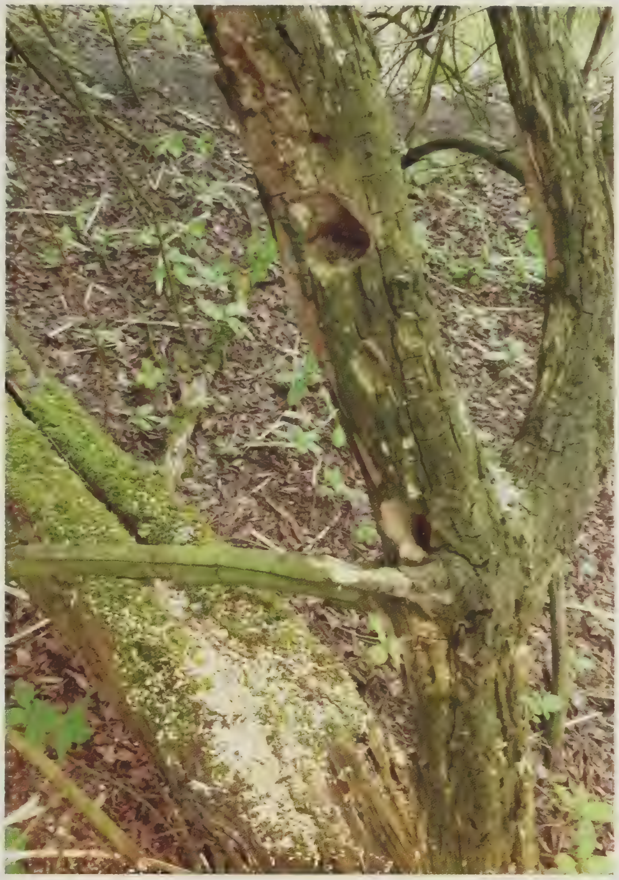
Conclusions

My study shows that a third of nesting attempts probably failed because of either avian predation or competition. The true figure may even be higher, if some nests were predated after my last visit. To me, this seems a large proportion and suggests that these two factors may play a greater role in the Willow Tit's decline than is currently acknowledged. Since Willow Tits expend so much time and energy in the excavation of their nest chamber, predation at the egg or chick stage greatly reduces the opportunity to make a second breeding attempt, and may therefore be an even greater setback than for other species of tits.

It has been suggested that Willow Tits nesting in their core habitat of scrub may get some protection by not having Great Spotted

Woodpeckers as nesting neighbours, but I have found that scrub-nesters are just as vulnerable to nest predation as woodland birds, and that woodpeckers will habitually travel to scrubby areas to forage.

Between 1967 and 2011, Blue and Great Tit numbers increased (nationally) by 37% and 110% respectively, while Great Spotted Woodpeckers increased by 405% (Baillie *et al.* 2014). I believe that these increasing populations strongly suggest a link with the demise of the Willow Tit. My study is regional (although Cheshire is now one of the strongholds of the British Willow Tit population) and may not reflect the wider national picture. Habitat deterioration may well be the most important factor in the species' decline, but I believe that avian predation and competition are important contributory factors, placing the Willow Tit under extreme pressure. The Willow Tit is effectively sedentary and once birds are in trouble in one area, the survivors may struggle to colonise new areas. As the population declines to dangerously low numbers, avian predation and competition may become even more significant factors – if a local population has been reduced to just one or two isolated pairs, a voracious Great Spotted Woodpecker could easily wipe out the entire surviving stock with little chance of recovery, resulting in local extinction.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20. A Willow Tit excavation with a substantial amount of chippings and wood dust on the nest tree, which may attract predators; Cheshire, April 2011.

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Water Pipits: three species rather than one?

Abstract Based on a distinctive call, differences in plumage and a preliminary genetic analysis, the 'Caucasian Water Pipit' *Anthus spinoletta coutellii* may represent a separate species within the Rock *A. petrosus*/Water Pipit *A. spinoletta* complex. The differences between the taxa currently treated as three races of a single species, the Water Pipit *A. spinoletta*, are described in this short paper.

The Water Pipit *Anthus spinoletta* is a widespread breeder in the Palearctic, with three currently recognised subspecies: nominate *spinoletta* inhabits the mountains of most of southern and central Europe; *A. s. coutellii* breeds from the Bosporus eastwards to Iran; and *A. s. blakistoni* breeds in central Asia, from Kazakhstan, into Russia, possibly Afghanistan (unclear), China and Mongolia (Alström & Mild 2003; del Hoyo *et al.* 2004; Gill & Donsker 2014; fig. 1). The 'Caucasian Water Pipit' *A. s. coutellii* is certainly a taxon that deserves further study. While the plumage differences, compared with nominate birds, have been well covered in key references such as Alström & Mild (2003) and van Duivendijk (2011), the distinctive call of *coutellii* has until recently been poorly described and the genetic status of this taxon has not been investigated.

Plumage

Compared with nominate *spinoletta, coutellii* is more obviously streaked above in all plumages. In summer plumage, *coutellii* shows more extensive, rich apricot colouring on the underparts than nominate *spinoletta,* with little or no streaking. In winter plumage, *coutellii* tends to show more contrast between the greyer head/nape and the light brown upperparts than *spinoletta* (which has generally more uniform, darker brown upperparts, with just a hint of grey to the nape), plus a paler rump patch, and lesser coverts which are contrastingly greyish. The pale supercilium tends to extend further behind the eye, while the underparts show sparser and finer streaking, and sometimes a yellow or apricot/buffish wash. On average the lores are somewhat paler (at least distally).

The eastern taxon *blakistoni* generally shows the palest plumage and least colour in

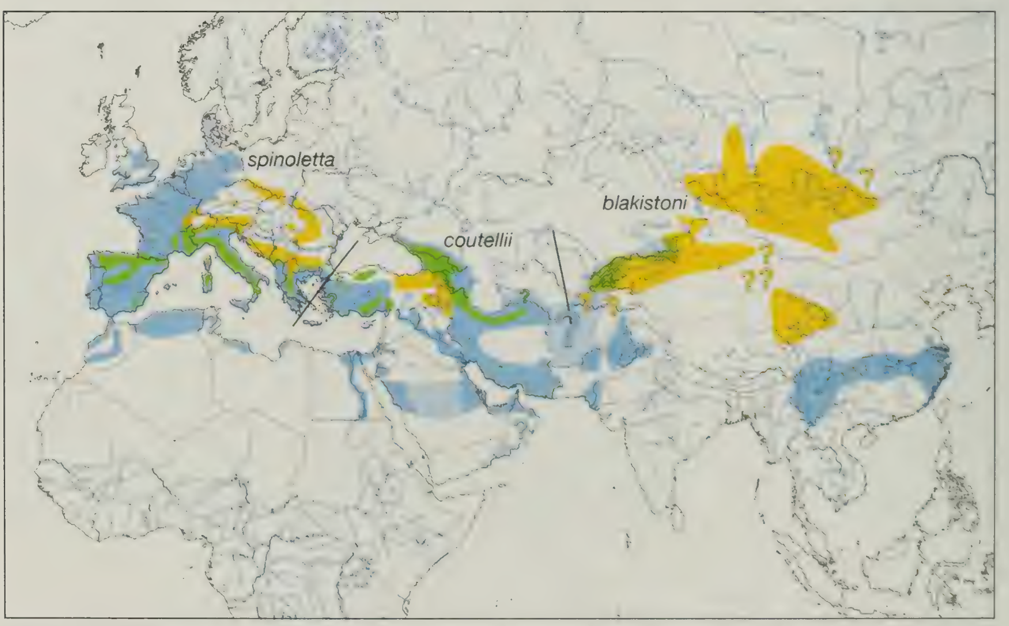
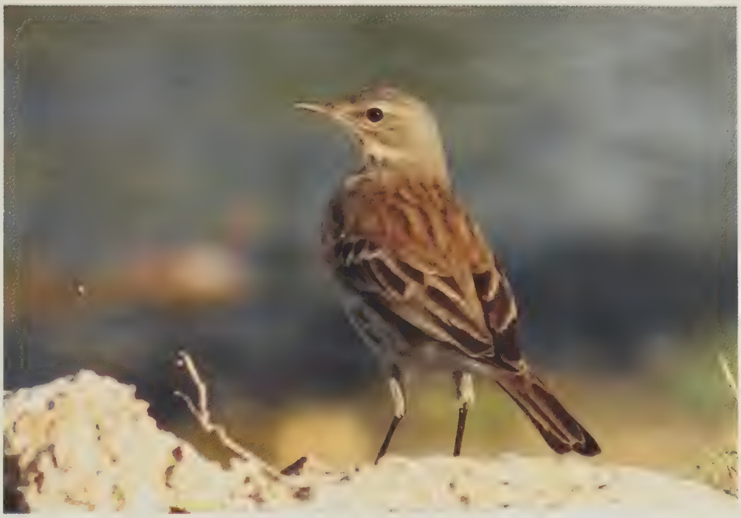


Fig. 1. The distribution of the three taxa currently treated as the Water Pipit *Anthus spinoletta*; reproduced from Alström & Mild (2003), with kind permission of the publisher, Christopher Helm/Bloomsbury.


Martin Garner

21. 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Negev, Israel, November 2012, showing contrast between greyish head and well-streaked brownish mantle.

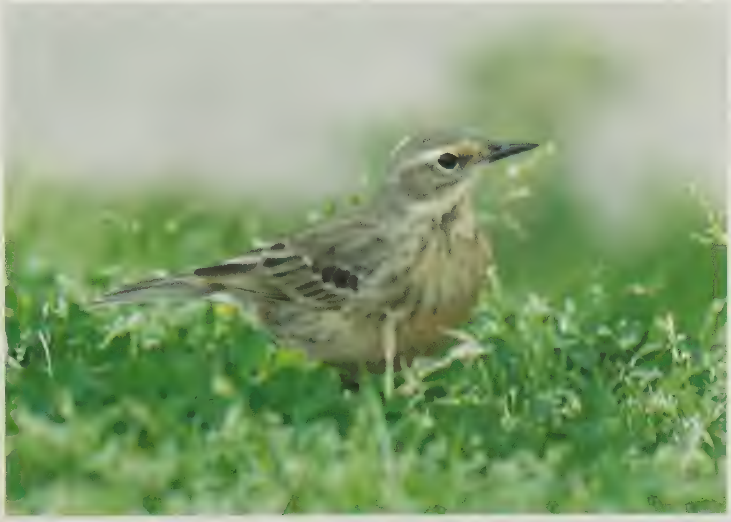
the underparts of these three taxa. It also shows a more obvious complete (or almost complete) pale eye-ring and broader supercilium, which exaggerates very plain lores and is reminiscent of Buff-bellied Pipit *A. rubescens* in this respect.

The second outermost tail feather (T5) in *coutellii* has a shorter pale wedge at the tip than *spinoletta* and the pale wedges on the outer tail feathers are closer to pale grey than white in *coutellii.* T5 is more extensively pale and whiter in *blakistoni* (Alström & Mild 2003; pers. obs.).

Calls

MG had previously noted that, compared with nominate *spinoletta* and Rock Pipits *A. petrosus*, the typical flight call of *coutellii* can sound quite different. It has a clearly more rasping or buzzing quality and it seems a shorter call. Sonograms show that the kink (or 'dog-leg') in the (more gently) ascending pitch at the start of a *spinoletta* call is missing or weak, and the call ends as sharply as it begins. Sonograms also show 2–3 deep modulations to the flight call, giving it a characteristic 'M'-shape, which is consistent with the perceived raspiness in the field and a sharp beginning and ending. While there is some variation in the calls, two recent studies of the calls of *coutellii* have confirmed this analysis (Honold & Martin 2013; Fijen 2014). With practice, calls heard in the field can sound more distinctive than implied by the existing literature.

We have not had the opportunity to study the calls of *blakistoni* in the field. Recordings suggest that the typical flight call of *blakistoni* is different again, with a simpler sonogram shape, and fewer modulations than *coutellii*, the product of a sweeter, more Meadow Pipit *A. pratensis*-like call. While more research is needed, the flight calls of both subspecies of Buff-bellied Pipits are typically distinctive, with that of nominate *rubescens* resembling a


Martin Garner

22. 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Eilat, Israel, March 2012. This individual is moulting into summer plumage with extensive peachy tones to the underparts; later in the spring, the streaking will become even more reduced.

cross between Meadow Pipit and Grey Wagtail *Motacilla cinerea*, and *A. r. japonicus* sounding closer to Meadow Pipit. The differences in call, plumage and DNA suggest that a taxonomic review of the two Buff-bellied Pipit taxa may also be fruitful.

Genetics

In order to investigate the genetic status of *coutellii*, body feathers that came loose from three birds during routine ringing sessions in northern Israel in mid November 2013 were collected by YP and YK (one of these birds is shown in plate 27). DNA was extracted from these feathers and mitochondrial genes were amplified and sequenced. This represents the first published genetic analysis of this taxon. A preliminary analysis of 1001 bp of

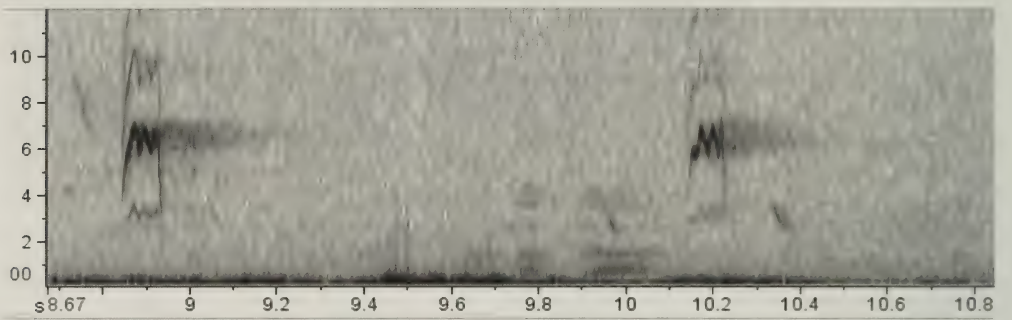


Fig. 2. Sonogram of 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Mount Hermon, Israel, November 2013, from a recording made by MG. Note: two or more well-spaced modulations, indicative of a rasping call, with a well-defined beginning and ending.

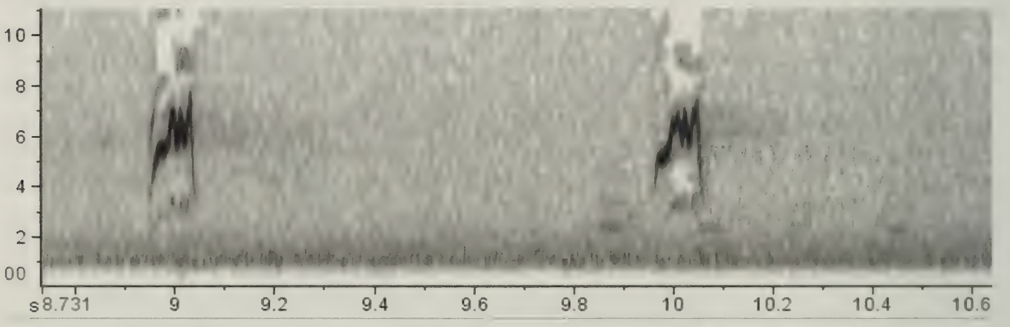


Fig. 3. Sonogram of Water Pipit *Anthus s. spinoletta*, Hulkesteinse Bos, Zeewolde, the Netherlands, December 2008, from a recording made by Ruud van Beusekom. The 'dog-leg' shape at the beginning of the sonogram is characteristic of the ascending pitch at the beginning of a *spinoletta* call, while (compared with *coutellii*) the modulations are closer together, and the call sounds correspondingly less harsh.

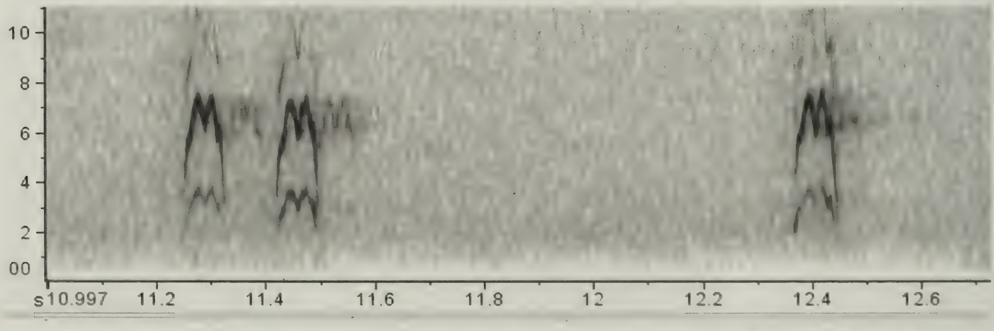


Fig. 4. Sonogram of Water Pipit *Anthus s. blakistoni*, Ili-Alatau National Park, Almaty province, Kazakhstan, May 2014, from a recording made by Arend Wassink. One obvious modulation to each call, no 'dog-leg' at the start (i.e. no kink in the steeper ascending pitch at the beginning), representing the 'sweetest', most Meadow Pipit-like sound of the three taxa.

cytochrome-b sequence from the first bird (AS01) (sequence uploaded to the European Nucleotide Archive with Accession number LN650643) showed a very significant 5% level of genetic difference both from an individual of nominate *spinoletta* sampled in the Swiss Alps by Arctander *et al.* (1996) and from a Rock Pipit sampled in Denmark for the same study. The 5% genetic divergence is much greater than that commonly found between subspecies of Palearctic species. However, very little comparable genetic material was available and, in particular, no Water Pipits of the eastern taxon *blakistoni* have been sequenced for *cytb*.

To expand the analysis the mitochondrial gene encoding cytochrome-c oxidase subunit 1 (*COI*) was sequenced for all three *coutellii* and compared with that of nominate *spinoletta* (from Denmark, the Netherlands and Italy), *blakistoni* from Kazakhstan, Russia (Tyva and Irkutsk) and Mongolia, and *littoralis* Rock Pipits from Scandinavia. Buff-bellied Pipits from North America and Russia were added to the analysis, as were Meadow Pipits from the UK to the eastern edge of the species' range in Russia (Tyumenska Oblast). This analysis confirmed and extended the *cytb* conclusions. Two of the *coutellii* have identical *COI* sequences and the other was 1 bp different, and together they formed a discrete clade separate from all other taxa. The degree of genetic divergence between *coutellii* and other Water Pipits was similar to that between *blakistoni* and nominate *spinoletta*, and greater than that between nominate *spinoletta* and Rock Pipit (fig. 5).

Several interesting results became apparent after the genetic analysis. Buff-bellied Pipits from North America (*A. r.*

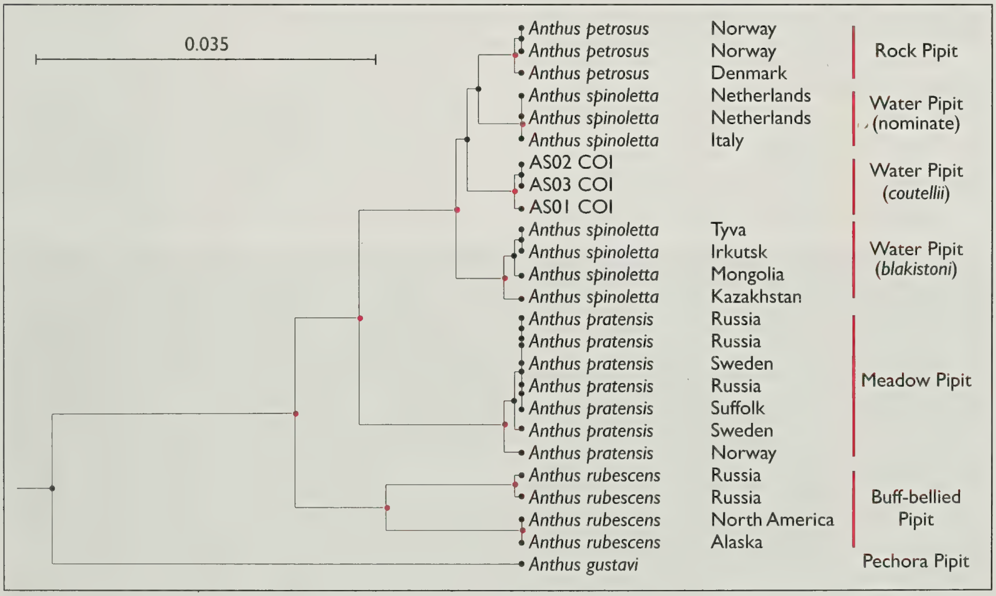
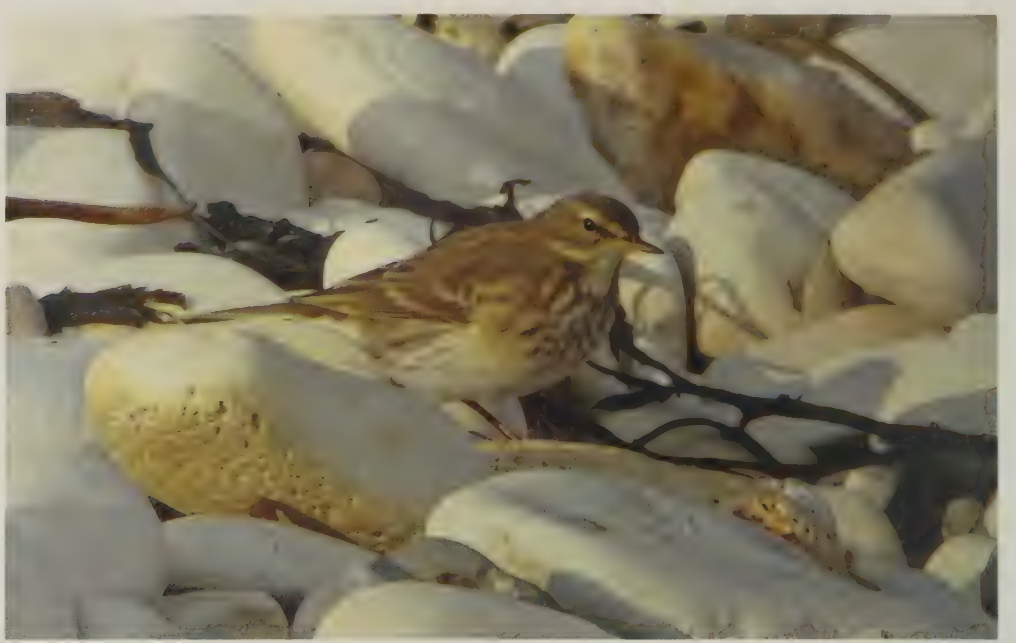


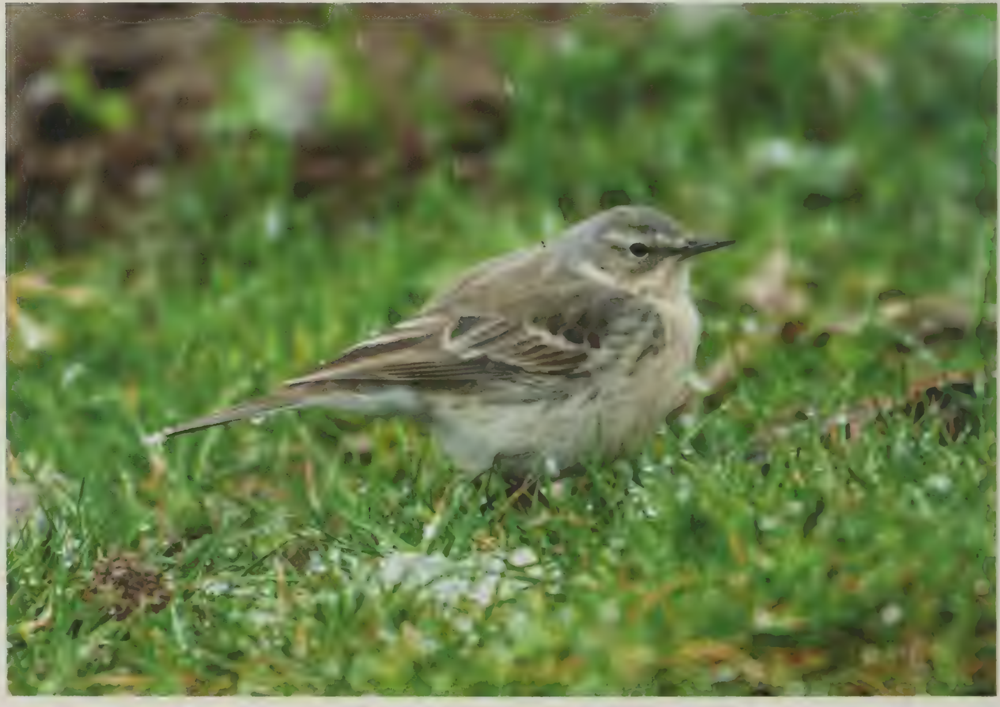
Fig. 5. Relationships of taxa within the Rock *Anthus petrosus*/Water *A. spinoletta*/Buff-bellied Pipit *A. rubescens* complex. A preliminary phylogenetic tree based on 597 bp of *COI* gene sequence obtained for all taxa. Important branch points, which have extremely strong bootstrap statistical support (90–100%), are highlighted in red. The tree suggests that nominate *spinoletta* Water Pipits are most closely related to Rock Pipits (all examples here are *littoralis*), and that the three *coutellii* Water Pipits from Mount Hermon (AS01–03) form a tight genetic grouping roughly equidistant from the nominate Water Pipit/Rock Pipit grouping and the *blakistoni* Water Pipit grouping. There is a deep genetic split in Buff-bellied Pipit correlating with the Old vs New World subspecies, potentially indicating another future split. DNA sequence Accession Numbers: *A. s. coutellii* (AS01, AS02, AS03) respectively) = LN650645, LN650646 and LN650647; *A. petrosus* = GU571252, GU571253, FJ465301; *A. s. spinoletta* = KF946592, KF946593, FJ465306; *A. s. blakistoni* = GQ481363, GQ481364, GQ481365, GQ481366; Meadow Pipit *A. pratensis* = GQ481350, GQ481351, GQ481352, GU571731, GU571732, GU571734, JN801265; *A. rubescens* = GQ481357, GQ481362, DQ432731, AY666215; Pechora Pipit *A. gustavi* = KC354895. A fully annotated tree showing bootstrap support values for each node will be available on the *BB* website (www.britishbirds.co.uk/birding-resources/key-refs/).



Andy Hood

23. Water Pipit *Anthus s. spinoletta*, Flamborough, Yorkshire, November 2014. A typical brown-and-white winter-plumaged Water Pipit with weakly streaked upperparts.

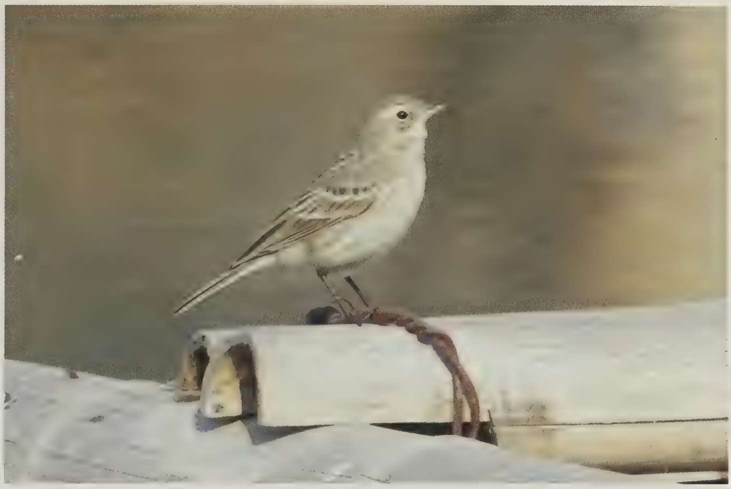
rubescens) and Russia (*A. r. japonicus*) are highly distinct genetically, but are nevertheless sister taxa. However, the Buff-bellied Pipits are apparently not as closely related to Rock and Water Pipits as the Meadow Pipit is – this is a counterintuitive result that deserves further study. It is very strongly supported by the current *COI* data but more sequence and a more sophisticated analysis would be needed before further conclusions could be



George Reszeter/www.birdsofeurope.co.uk

24. Water Pipit *Anthus s. spinoletta*, Pyrenees, Spain, April 2004. Note pinkish tones across the underparts, less extensive than in *coutellii*, and very little streaking on the upperparts.

drawn. In stark contrast to Buff-bellied and Water/Rock Pipits, Meadow Pipits are genetically very similar across their range. There is very strong support in the *COI* tree to show that Water Pipit as currently defined is paraphyletic, because the Water Pipit clade includes Rock Pipit. The exact relationship of the *blakistoni*, *coutellii* and nominate *spinoletta*/*petrosus* clades to each other is not well resolved at present, but the apparent paraphyly of the grouping suggests that splits are necessary, and the more or less equidistant genetic distinctiveness of the three Water Pipit taxa from each other suggests that species status may be merited not only for *coutellii* but also for *blakistoni*.



Terry Townshend

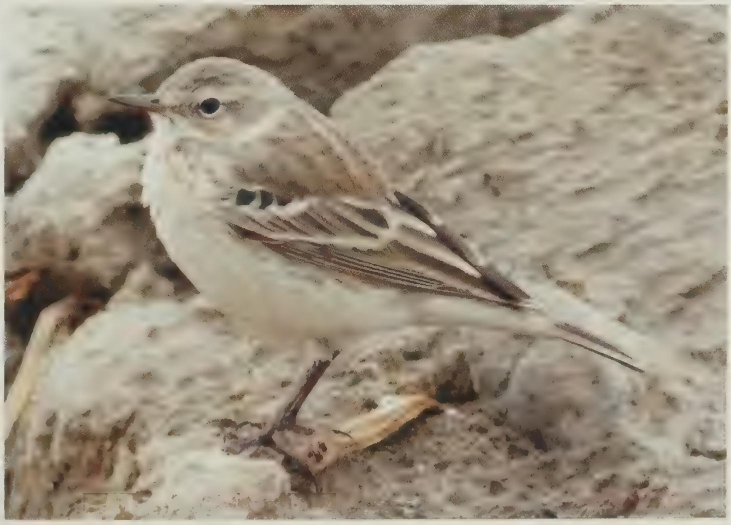
25. Water Pipit *Anthus spinoletta blakistoni*, Beijing, China, February 2012. The palest of the three Water Pipit taxa, with a particularly broad supercilium, plain lores (giving a characteristically open-faced appearance), and with the most limited underpart streaking in winter plumage.

Conclusion

We consider that there is a combination of plumage, vocal and genetic evidence to suggest that 'Caucasian Water Pipit' may represent a separate species within the Rock/Water Pipit complex. Further sampling of all taxa and an analysis of nuclear genes is required, but a three-way split of Water Pipit may have to be considered. As recently as 1986, Buff-bellied, Water and Rock Pipits were all included in a single species, but were split on the basis of their well-characterised differences in plumage, vocalisations, biometrics and breeding ecology (Knox 1988). The data presented here suggest that there may be more work to do, and that the book has not yet closed on the taxonomy of this group.

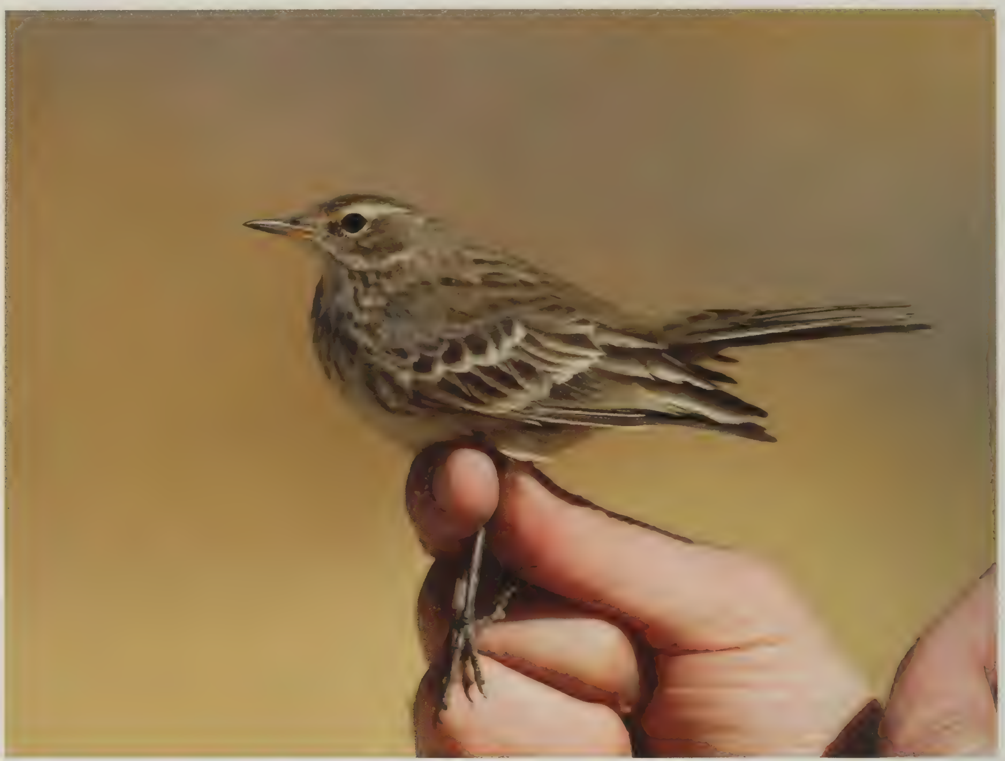
Acknowledgments

We thank Dan Alon and Jonathan Meyrav for their contributions to the work summarised here, and Sander Bot, Thijs Fijen and George Sangster for comments on a draft of the manuscript. MG has studied Water Pipits during three visits to Israel, in both spring and autumn, in collaboration with the Society



Terry Townshend

26. Water Pipit *Anthus spinoletta blakistoni*, Beijing, China, April 2012. The grey head contrasts with browner upperparts, as in *coutellii*, although *blakistoni* has the least amount of pinkish colouring to the underparts in spring of the three taxa discussed here.


Martin Garner

27. 'Caucasian Water Pipit' *Anthus spinoletta coutellii*, Mount Hermon, Israel, November 2013. DNA from this individual contributed to the genetic basis of the work reported here. Visible here are colder, greyer-toned lesser coverts, contrasting with well-streaked brown mantle and scapulars. Also visible is the pale rump patch.

for Protection of Nature in Israel (SPNI). For assistance with sound recordings thanks to Ruud van Beusekom, Thijs Fijen, Paul Marvin, Matt Slaymaker and Arend Wassink. Sonograms were derived using Raven Pro software (Cornell University); sequence analysis was performed using CLC sequence viewer (www.clcbio.com).

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Letters

The categorisation of the Cornish House Finch

Having seen the 2010 House Finch *Haemorhous mexicanus* in both Cornwall and Devon, I read with interest Andrew Harrop's recent summary of the decision by BOURC to place the record in Category E of the British List (Harrop 2014). It was considered that the bird's yellow plumage and long stay militated against a wild origin, but the sentence that really caught my eye was: 'Perhaps most importantly, there were concerns that a vagrant House Finch would be unlikely to have arrived without ship assistance.'

In an editorial comment in *BB* relating to the admission of Lark Sparrow *Chondestes grammacus* to the British List (Charlton 1995), the then BOURC Chairman, David Parkin, commented as follows: 'However, its arrival in midsummer [July 1981] at a location close to a major container port [Felixstowe, Suffolk] led most members of the Committee to conclude that the bird had probably arrived with the benefit of ship assistance... The Committee's North American consultant, however, expressed the strong opinion that Lark Sparrows did not cross the Gulf of Mexico, so were very unlikely to land on a ship and be carried on board across the Atlantic.' The bird was duly placed in Category D of the British List, but that decision proved controversial and, as that same editorial explained, it was reversed in 1986 when the criteria were reviewed: 'Category D2 was amended to include those birds which "certainly arrived with a combination of ship and human assistance, including the provision of food and shelter".' This change cleared the way for the acceptance of ship-assisted birds, provided they had not been fed, housed or cared for by man. The new policy recognised the obvious fact that birds move about the world, more or less naturally, using ships and, with the non-feeding/non-housing proviso, they are eligible for admission to Category A. This, as I understand it, remains the position today, although records from the former Category D2 are now placed in the relatively new Category E, which includes 'human-assisted transportees' (www.bou.org.uk). There is, however, an obvious flaw in this arrangement: in the vast majority of cases, how would anyone ever *know* whether a bird had been deliberately given food and/or shelter during a transatlantic crossing?

In relation to the House Finch, a number of specific points need addressing. Firstly, Harrop stated that: 'As noted by Hill (2002), most House Finches in the USA do not migrate, though migratory behaviour seems to be developing in some introduced eastern populations.' However, in his analysis of North American landbird vagrancy in Britain, Bond (2014) stated that: 'Most distribution maps show House Finch as a resident species (Cornell 2012), which underlies its classification as being of low vagrancy potential, yet the eastern population (introduced into New York in around 1940) has rapidly evolved migratory behaviour, with ringing recoveries demonstrating movements up to 1,295 km (Able & Belthoff 1988). Movements of these two species [Yellow-headed Blackbird *Xanthocephalus xanthocephalus* being the other] are actually similar to those of other species already accepted onto the British List.'

Harrop outlined the weather in relation to two previous records of House Finch, on Fair Isle (25th–28th May 1962 and 27th–30th April 1966), but it is surprising that no mention was made of the weather in relation to the arrival of the Cornish bird. This is, in fact, fundamental to the consideration of the record. While there were no significant westerlies across Britain prior to its appearance, events on the opposite side of the Atlantic were exceptional. The following was gleaned from http://birdingnewfoundland.blogspot.com ('Birding Newfoundland with Dave Brown'). From 29th April to 7th May 2010, there were some amazing falls of southern North American species in Newfoundland, including many vagrants such as Great *Ardea alba*, Snowy *Egretta thula* and Cattle Egrets *Bubulcus ibis*, Chimney Swift *Chaetura pelagica*, Eastern Phoebe *Sayornis phoebe*, Cliff Swallow *Petrochelidon pyrrhonota*, Purple Martin *Progne subis*, Grey Catbird *Dumetella carolinensis*, Scarlet Tanager *Piranga olivacea*, Swainson's Thrush *Catharus ustulatus*, Veery *C. fuscescens*, Rose-breasted Grosbeak *Pheucticus ludovicianus* (an unprecedented 50+ reports), Indigo Bunting *Passerina cyanea*, Baltimore Oriole *Icterus galbula*, Hooded Warbler *Setophaga citrina* and Prothonotary Warbler *Protonotaria citrea*, plus big falls of Hermit Thrushes *C. guttatus* and White-throated Sparrows *Zonotrichia albicollis*, as well as Grey-cheeked Thrushes *C. minimus* arriving *a month earlier* than normal. These falls of southern rarities were due to a series of low pressure systems that moved quickly up the eastern seaboard of the USA from the Carolinas (or points to the south) producing offshore winds that blew migrating birds out over the sea and direct to Newfoundland, bypassing the northeast coast of the USA and the other eastern Canadian maritime provinces, which did not record significant falls. Oddly, there were also several European species in Newfoundland at the same time: Garganey *Anas querquedula*, Northern Lapwing *Vanellus vanellus*, Ruff *Philomachus pugnax*, Northern Wheatear *Oenanthe oenanthe* and an exceptional 50+ European Golden Plovers *Pluvialis apricaria*, these birds having arrived on strong *easterly* winds which blew around the northern sides of these depressions.

Given that the offshore winds blew so many migrants out over the western Atlantic, it is hardly surprising that some of them landed on ships and made it all the way to Britain, as evidenced by a record arrival of seven White-throated Sparrows, plus two Dark-eyed Juncos *Junco hyemalis*. As stated in Hudson *et al.* (2011): 'A significant clue as to how these sparrows crossed the Atlantic came in the shape of one individual [White-throated Sparrow] that arrived in Southampton Docks, Hampshire, at 6.30 am on 6th May 2010. It was the last of five that had been on the deck of the *Queen Mary 2* ever since leaving New York on 29th April; four of these had still been aboard on 5th May, the day that this 12-storey-high luxury liner sailed within 30 km of the Isles of Scilly and along the southern coastline of Devon and Cornwall.' These ships apparently take about six days to cross the Atlantic which, given that the Canadian falls started on 29th April, would tie in well with the appearance of the House Finch at Land's End on 4th May. In fact, it occurred just four days after the discovery of the first-ever White-throated Sparrow for Cornwall (at Boscastle on 30th April) and 22 days before the long-overdue first record of that species on Scilly, on 26th May (Hudson *et al* 2011).

Photographs indicated that it showed no abnormal plumage wear – in fact, its plumage and bare parts were both in pristine condition. Turning to its colour, websites that I have looked at describe yellow male House Finches as 'uncommon' rather than 'rare'; one site said that about 5% are yellow in the eastern USA. In an examination of eastern birds between 1976 and 1992, Zahn & Rothstein (1999) found that 91.3% were red, 6.7% orange, 0.8% yellow and 1.3% red and gold. In California, there had been 'evidence of a shift away from red plumage that predominated earlier in this [the twentieth] century'. They related this increase to a high incidence of avian pox. Whether this increase in orange and yellow birds has also been shown more recently in eastern birds is not clear but, whatever the current figure, this would not in any case be the first 'minority-plumaged' American vagrant to have reached Britain. An abnormally plumaged male Varied Thrush *Ixoreus naevius* turned up in Cornwall in November 1982 (Madge *et al.* 1990), which lacked any orange, but an even more relevant example is the Western Palearctic's first Savannah Sparrow *Passerculus sandwichensis*, at Portland, Dorset, in April 1982. That bird was considered to have been of the race *princeps* or 'Ipswich Sparrow', which breeds solely on Sable Island off the coast of Nova Scotia, with a relatively tiny springtime population of just 2,000–3,000 birds (Broyd 1985). It seems highly likely that its arrival in Britain was ship-assisted. Given the western locality and the meteorological events outlined above, this must surely be the most likely explanation for the appearance of the House Finch.

To summarise: (a) the bird's plumage was in pristine condition; (b) many eastern male House Finches routinely show yellow plumage, particularly in their first year;

(c) there were exceptional weather conditions along the eastern seaboard of North America; (d) a large cruise liner, known to be carrying stowaway White-throated Sparrows, passed Land's End the day after the bird's arrival; (e) there was a record arrival of White-throated Sparrows in the spring of 2010 (including the first-ever records for Cornwall and Scilly); and (f) it is now known that the introduced eastern population of House Finch has developed migratory habits similar to those of other North American passerine vagrants already on the British List. Given these conclusions, the overwhelming probability must surely be that the House Finch was a genuine ship-assisted vagrant, albeit from an introduced population. That being the case, it should be admitted to Category C5 of the British List, which deals with vagrants from 'established naturalised populations abroad' (www.bou.org.uk).

For those still unconvinced by the foregoing arguments, consider the following hypothetical scenario. A White-throated Sparrow and a House Finch, migrating north along the eastern seaboard of the USA, are blown out to sea and both land on a ship bound for Britain. The two birds then leave the ship as it passes the southwest tip of Cornwall and are subsequently discovered together at Land's End. They are seen by large numbers of birders but, despite arriving together at exactly the same time and by exactly the same method, only the White-throated Sparrow can be added to their lists. Given that prettiness of plumage is not a barrier to acceptance, it is patently obvious that such a decision would be unsustainable.

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Keith Vinicombe, Bristol

Editorial comment Martin Collinson, BOURC Chairman, has replied as follows: 'We thank Keith Vinicombe for his views on the 2010 House Finch, which were previously published substantially on the Surfbirds internet forum in that year. A scenario where a House Finch were to be displaced by offshore winds from the east coast of the USA and to make an assisted passage to Britain is of course plausible. Indeed, when this record was considered by BOURC, some members thought that this was the most likely probability, and voted to accept the species onto the British List. Nevertheless, the scenario is speculation. What Keith does not mention in his letter are the undisputed facts that: a) House Finch remains a common 'mainstream' cagebird; b) the dietary deficiencies that lead to yellow plumage coloration are much more likely to happen in captivity than in the wild; c) escaped cagebirds can and do appear at migration hotspots during peak migration periods; and d) House Finches have been recorded recently in Europe that are certain, or almost certain, escapes. Captive status is the *crucial* difference between House Finch and the various sparrow species mentioned. While we discuss some other issues surrounding the House Finch and other potentially ship-assisted birds below, they should not detract from this key point.

'Keith is fully aware that BOURC operates a committee structure, making collective decisions that insulate the British List from the personal opinions of any one individual member. While an individual birder, member or non-member of BOURC may regard the case for acceptance of

House Finch (or any other bird) as convincing, if the evidence really were overwhelming, the committee as a whole would be overwhelmed by the evidence. That did not happen in this instance. Every bird species is different and every case is assessed on its own merits, by the individuals on the committee at the time, in light of all the most recent evidence. BOURC membership rotates, but what BOURC has is consistency of *process* – a process that has been shown to work over many years. The paper summarising the assessment of the House Finch was intended to demonstrate that process so that the ornithological community could appreciate the care that BOURC takes in making every decision.

'BOURC recently reviewed its treatment of potentially ship-assisted vagrants and decided not to change its criteria. Known or suspected ship assistance is not a barrier to acceptance providing the bird was not deliberately fed or sheltered, and the species is thought to be capable of arriving here without assistance under favourable conditions (i.e. the species is migratory and its migratory route matches that of other species believed to occur naturally). At the same time, BOURC recognises that in many cases there are insufficient data to objectively evaluate these criteria, and that not everyone will agree about them. Individuals of a species such as Blackpoll Warbler *Setophaga striata*, which stores large amounts of fat and flies non-stop for 3–4 days from North to South America, are clearly capable of unassisted transatlantic vagrancy under favourable conditions. Sedentary species that do not store fat or show any physiological adaptations to long-distance migration are presumably unable to get to western Europe unassisted. However, many North American passerines that have been recorded in Europe fall into a grey area in which there is not enough information available to make a definitive decision. Similarly, the requirement that birds must not be deliberately fed or sheltered is something that cannot normally be addressed. We know that passengers and crew often take pity on birds on board ships, and that several individual birds have excluded themselves from the record because they accepted food or shelter. For most potentially ship-assisted birds, however, again we have no information about what happened to them on their crossing. A situation where the less that BOURC knows about a bird, the better its chances of getting on the British List is inherently nonsensical. Furthermore, does it really matter whether, for example, a Grey Catbird *Dumetella carolinensis* on board ship eats a jammie dodger deliberately fed to it, or eats a jammie dodger accidentally dropped by a sailor or cruise passenger? Birds care not one jot where their food or shelter comes from – they have no concept of 'the rules' and don't 'cheat'. They have no concept of why they migrate or what vagrancy is. Birds only do one thing: try to survive. If they are lucky, they survive to breed. There are many examples of anthropogenically facilitated range-extensions of avian species, some of which were deliberate, and some which were not. The end result is the same – birds in new countries. Why, therefore, does BOURC expose itself to criticism by people who appear to enjoy shooting fish in barrels, by imposing extra, unenforceable rules for admittance to the British List that do not apply in all other European countries?

'BOURC members are not stupid, and are not blind to the absurdities. The rules exist in part because birders and ornithologists want them. It is our intention to maintain a British List that in some way reflects the 'natural' behaviour of the birds on the List. It is not our intention to admit escapees, port-to-port transportees or birds that were deliberately kept alive by man on their way to Britain. From a birding point of view, it must be recognised that these are 'sporting' rules that keep the likes of Snowy Sheathbill *Chionis albus* off the List – they have no biological meaning in the modern world where birds (and other animals and plants) are constantly transported around the world by man. Although the British List is not maintained simply to provide a format for birders to base their personal lists on, for some, birding is a sport and comparison of lists an essential part of it. We do not tell birders what species they can and cannot include on their personal lists. If the British List does not suit the purposes of such comparative listing for some people, then there are of course other lists available.

'In addition, the British List has a quasi-legal status for legislative reasons. At least, the admission or not of a species to the List may have legal implications for the protection of individuals of that species in the wild in Britain. Artificial introduction of new species to ecosystems is often deleterious, and eradication of ecologically damaging aliens is a pressing problem for nature conservation agencies worldwide. People who criticise decisions that BOURC makes need to remember that this is the context in which BOURC works. We have rules because BOURC would be neglecting its duties if any bird that arrived in Britain on board ship had automatic entry to the British List. This is also why our standards are so high. It may mean that there is collateral damage for birds such as House Finch, for which a case for admission to the List could plausibly be made, but a strong escape potential exists.

'There are also issues of categorisation with this record. House Finch might be regarded as a candidate for Category D, but under BOURC's Standing Orders, Category D is only an option for species that would otherwise be in Category A. Category C5, 'species from established naturalised populations abroad' is the only subcategory of C that requires a vagrancy event to occur. There seems to be no biological reason why Category D should not be a holding option also for potential Category C5 species, and if Standing Orders were to change, House Finch may qualify if the Committee considered this appropriate.'

The origin of a fall of migrating birds in North-east Scotland

During 1958–60, I spent two springs and three autumns observing bird migration with radar in North-east Scotland, as a part of a programme organised by David Lack (Bourne 1963, 1990; Anderson 2013, p. 176). On only one occasion did I see a 'fall' of bird migrants of the sort discussed by Aspinall (2014). On 1st November 1958, there was a wild southeast gale as a front passed east over the area, although the weather was reported to be fine over Scandinavia. The following morning, the Aberdeen gale was replaced by a light southwest wind and a little high cloud. The radar screen showed a moderately large, high WSW arrival of migrants – a pattern that was typical for the season, except for the fact that most birds descended at the coast instead of continuing inland. There was a small departure to the SSE, and (unusually) new arrivals continued moving southwest into the afternoon.

When I went up the coast that morning, I saw 86 birds arriving over the sea between 10.00–11.00 hrs, and 83 between 11.45–12.15 hrs, including 133 Redwings *Turdus iliacus*, 25 Blackbirds *Turdus merula* and 16 Snow Buntings *Plectrophenax nivalis*, with more birds coming in throughout the afternoon. Just inland of the coast there were thousands of Blackbirds, hundreds of Redwings and Fieldfares *T. pilaris*, fair numbers of Snow Buntings, Common Starlings *Sturnus vulgaris*, Song Thrushes *Turdus philomelos* and Robins *Erithacus rubecula*, with fewer Dunnocks *Prunella modularis*, Bramblings *Fringilla montifringilla* and Chaffinches *F. coelebs*, together with Woodcock *Scolopax rusticola* and Common Snipe *Gallinago gallinago*, but little else.

The presence of Snow Buntings, but not more southerly species such as the Skylark *Alauda arvensis*, suggests a Scandinavian origin, as does the fact that migrants that had come through the front over the sea were left so exhausted that they settled as soon as they reached land instead of the normal pattern of continuing inland. The birds involved were not visibly drifted, although there may have been some element of drift farther east as they passed the front.

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Reviews

Puffins

By Euan Dunn
Bloomsbury, 2014; Softback, 128 pp; numerous colour illustrations
ISBN 978-1-4729-0354-9 Subbuteo code M24075
£9.99 *BB* Bookshop price £9.00

There can be few birds so easily identified, so loved and so very special as the Puffin *Fratercula arctica.* As the author says, 'A major Puffin colony, pulsing with movement, colour, sound and smell, all part of the everyday drama of raising offspring, is one of the most exhilarating assaults on the senses these islands can offer.' I can only agree, having been fortunate to live for seven years within the Puffin colony on Skomer, Pembrokeshire, the largest colony in Wales. Puffins continually perched on our roof – what better vantage point for a rapid take-off? They even occasionally came down the chimney, and being confronted by an angry, soot-covered Puffin is quite an experience. Most exciting of all, however, was when, after a winter at sea, the Puffins returned and the first landings took place. The previously empty slopes around our home suddenly becoming a wonderful hive of activity. Indeed, it was on Skomer, and earlier on nearby Skokholm, that R. M. Lockley carried out research into the life history of Puffins and subsequently wrote his monograph, *Puffins,* published in 1953. Unfortunately, his work is not even mentioned in the present volume.

The last census of Puffins took place in 2000 when the British and Irish population was estimated at just over 600,000 pairs, of which 82% were in Scotland, the largest concentration being about 136,000 pairs on St Kilda. This and other remote islands may be difficult to reach, though, and the author provides much information on more accessible, if smaller, colonies including some at mainland sites like Bempton Cliffs in Yorkshire.

Puffins are ashore from early April until early August, and for the rest of the year we knew almost nothing about their lives. But the recent use of geolocators is changing that and starting to reveal extraordinary new information. Perhaps none more so than that some Puffins from south-west Ireland cross the Atlantic to waters around Labrador and Newfoundland to feed, before returning after between two to six weeks.

A more comprehensive index would have been helpful. However, this lavishly illustrated book packed with information and modestly priced makes an ideal present, especially for someone who has still to visit a Puffin colony. And surely you will want one for your own shelves as well.

David Saunders

Arran Bird Atlas 2007–2012: mapping the breeding and wintering birds of Arran

By Jim Cassels
Arran Natural History Society and the SOC, 2014
Pbk, 158pp; photographs, maps and tables
ISBN 978-0-9512139-5-7 Subbuteo code 1213957
£8.00 *BB* Bookshop price £7.00

This is an attractively priced but basic report on a local atlas project. The whole of the island of Arran, which lies in the Firth of Clyde, was surveyed at the tetrad scale (139 tetrads) in parallel with the national *Bird Atlas 2007–11* – plus an additional year to complete the coverage. This is the first time that an atlas at this scale has been attempted on Arran and so it provides a baseline for any future work. Jim Cassels deserves great praise for his hard work to ensure that the fieldwork was completed. Arran is often said to be 'Scotland in miniature' and surveying the mountainous interior in the winter proved to be quite a challenge.

The book provides an attractive and colourful overview of the island's breeding and wintering

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avifauna, with all species illustrated with a small photograph. All but the rarest species have a tetrad-scale map showing breeding period and/or winter distribution, and a simple table showing the number of tetrads in which the species was recorded, subdivided by the level of evidence for the breeding-season records. The short introductory chapters describe the project and the habitats of Arran.

The species texts are very brief and provide no interpretation of the maps – they are really just status comments. The introductory chapters present the facts but again do not attempt any analysis. This will satisfy casual readers and visitors to the island, but I found the lack of depth disappointing; I would like to understand how the distributions relate to the geography of the island. Why do some species, such as Great Spotted Woodpecker *Dendrocopos major*, Wood Warbler *Phylloscopus sibilatrix* and Eurasian Treecreeper *Certhia familiaris*, occur in some woodlands but not others, for instance? There would have been ample room to include even just one sentence to help bring the maps alive. This local atlas does not match the professional appearance of some of those larger volumes already published, but as an easy reference for those familiar with the island it would be a useful companion for any visit.

Mark Holling

Claxton: field notes from a small planet

By Mark Cocker
Jonathan Cape, 2014
Hbk; xii + 240pp
ISBN 978-0224-09965-3 Subbuteo code 4099653
£14.99 *BB* Bookshop price £13.50

To use an optical analogy, Mark Cocker has great depth of field. His last book was the monumental *Birds and People* (2013), a panoramic survey of cultural responses to birds from all round the world; but he now focuses down on the wildlife in just one small parish – the village of Claxton in Norfolk, where he has lived for the last 12 years. Readers will already have a sense of this area and what it means to him from his earlier *Crow Country* (2007) and from his regular *Guardian* 'Country Diary' contributions. Indeed, *Claxton* largely consists of a selection of these diary pieces, now further shaped and polished and strung like a set of exquisite bright beads on the line of a year's calendar. This is the art of the miniaturist, a concentration of perception and its expression that evokes the universal from the closely observed particular. It is the prose equivalent of the Haiku.

The particulars in question are very various. Birds feature prominently, of course: in the winter months the local Barn Owls, Peregrines and the famous gatherings of Rooks are part of his regular cast, along with visiting Bewick's Swans with their 'woodwind calls ... rather resembling wind chimes'; and through the year's turning we meet the changing succession of spring, summer, autumn and then again winter migrants. Occasionally there are rarer visitors, but the whole emphasis is on the ordinary, or rather the extraordinary *in* the ordinary – like the wonderful epiphany of the Spotted Flycatcher in his garden on 3rd September, 'duller than any Dunnock' but 'a rainbow of colour expressed in movement'. But birds are only the more conspicuous players among the *dramatis personae* of the village year. Cocker has made himself – has been inspired to become – an all-round naturalist, who now takes as much delight in St Mark's Flies and Meadow Browns as in Marsh Harriers. We encounter all these and more in his sharp-eyed, inquisitive company.

The seasonal cycle of the year provides the structure for the book, in which the pieces are arranged in chronological order in twelve chapters, one for each month. One can therefore drop in anywhere and get a prompt about what to look out for that week in one's own patch. I tested this while contemplating this review – and there in his 26th August entry was a captivating account of the Poplar Hawk-moth I had just caught that day in my own moth trap ('a compound of the monstrous and of perfection'). Each week offers a new discovery, or a new perception of familiar experiences.

But one of the most important elements of this book is of a different kind and comes right at the end – his Claxton Parish Species List, covering all the taxa he has so far identified in his village. This should perhaps have been given more prominence in the publisher's blurb, since it is really more like the vertebrae of the book than its appendix. Lists have always been important to naturalists, not just for the harmless fun of the tally stick, but as an

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inventory of our natural heritage that can serve as an index of secular change and a benchmark for conservation. Cocker also insists that many of the vernacular English names of these wonderful organisms contain within them their own narrative histories and affirmations and are equally deserving of wonder and celebration. Think of the Ghost Moth, Smoky Wainscot, Common Stinkhorn, Primrose and leaf miners, each an invitation into a more intimate and understanding relationship with its bearer. These lists are in the end a kind of meditation in themselves, encouraging the biblical injunction, 'Go, and do thou likewise.'

This is nature writing of a high order and Cocker now takes his place in a grand tradition of diarists that runs from Gilbert White through such authors as Henry Thoreau, Richard Jefferies and John Baker. Perhaps particularly Thoreau, and the comparison is a suggestive one. There is a freshness, vitality and sense of authenticity in the flow of the prose, but also a strong undercurrent of deep concern about our natural environment that speaks of some larger engagement and vision. *Claxton* is probably Mark Cocker's most important book to date, and we are left hoping that these themes will be developed in his next one.

Jeremy Mynott

Coastal Birds

By Richard Allen
Jardine Press Ltd, 2014; Hbk, 48pp; black-and-white images throughout
ISBN 978-0-9926877-1-7 Subbuteo code M24369
£9.50 ***BB* Bookshop price £8.55**

It begins with a cover designed in a style of a different age, reminiscent of childhood Ladybird Books. The nostalgic theme continues through pages full of splendid linocut images and words inspired by the birds watched and sketched along the Colne Estuary in Essex.

Richard Allen has clearly had a vision about the layout of *Coastal Birds*. The temptation may have been to make it a larger-sized book with colour added here and there. But the small format, 12 × 12 cm, with black printing on ivory-coloured pages, creates an impact and cosy appeal that would certainly be lost on anything grander. I like it.

Dan Powell

The Birdwatcher's Yearbook 2015

Edited by David Cromack; Buckingham Press, 2014; pbk, 328pp.
ISBN 978-0-95698-768-6 Subbuteo code 6987686
£16.50 ***BB* Bookshop price £14.85**

If you prefer a book on your shelf to surfing the net, this is the volume that pulls together so much useful information, all for less than a £20 note. It is a fully updated guide to almost 370 UK bird and nature reserves; a county by county directory with details of all the key contacts, plus birding events, trade outlets, art galleries and more; tide tables, and checklists of birds, butterflies and dragonflies.

RR

Finding Birds in South-west Turkey

By Dave Gosney; Easybirder, 2014; DVD (72 mins) and booklet (40pp)
ISBN 978-1-907316-46-3 £20.00

The latest offering in this excellent series from Dave Gosney describes the best birdwatching sites close to resorts such as Dalyan, Fethiye, Bodrum, Kalkan, Antalya and Manavgat, but also deals with areas farther inland. There are full details of where to find birds such as Brown Fish Owl *Bubo zeylonensis*, Krüper's Nuthatch *Sitta krueperi* and so many more that make your mouth water; up-to-date and accurate maps, with GPS coordinates for each site; and a review of other published material. It's the perfect starting point if you're thinking of a trip to the country, and if you're heading out there in spring, remember to add your records to BirdTrack for the new European Atlas (see pp. 2–6).

RR

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Recent reports

Compiled by Barry Nightingale and Harry Hussey

This summary of unchecked reports covers early November to early December 2014.

Headlines After another exciting autumn, things finally began to slow down through this period towards the midwinter doldrums. Nonetheless, there was still real quality to be found, with a Little Bustard in Dorset, an American Coot in the Outer Hebrides (plus a long-stayer remaining in Ireland), Eastern Black Redstarts on Scilly and in Yorkshire, and Blyth's Pipits in Pembrokeshire and Yorkshire. These were bolstered by a good supporting cast of other passerine arrivals from the east and southeast, including Isabelline Shrike, four Hume's Warblers, White's Thrush and Red-flanked Bluetail in the Northern Isles, more Desert Wheatears and a late Isabelline Wheatear, and a small arrival of Penduline Tits in the southern half of England.

Ross's Goose *Anser rossii* Marshside (Lancashire & N Merseyside), 30th November; Dunbar (Lothian), 7th–9th December. **Canada Goose** *Branta canadensis* One of the smaller races remained at North Slob (Co. Wexford), to 7th December. **Cackling Goose** *Branta hutchinsii* Long-stayers Islay (Argyll), to 19th November, and Lissadell (Co. Sligo), to 30th November; Cuckmere Haven (Sussex), 5th December. **Red-breasted Goose** *Branta ruficollis* Loch of Harray/Tormiston (Orkney), 10th–25th November. **American Wigeon** *Anas americana* Long-stayers Co. Donegal, Highland, Co. Leitrim, Outer Hebrides and Shetland, with new arrivals on Shapinsay (Orkney), Gannel Estuary (Cornwall – two) and Morwellham Quay (Devon). **Ferruginous Duck** *Aythya nyroca* Blashford Lakes (Hampshire), 10th November to 8th December; Brogborough Lake (Bedfordshire), 11th–20th November. **Lesser Scaup** *Aythya affinis* Long-stayers Cardiff Bay Wetlands/Cosmeston Lakes (East Glamorgan), Lough Gill (Co. Kerry) and Llangorse Lake (Breconshire). **King Eider** *Somateria spectabilis* Ruddon's Point (Fife), 30th November and 6th December. **Surf Scoter** *Melanitta perspicillata* Long-stayers in Denbighshire (up to nine), Dorset, Essex/Suffolk, Lothian, Co. Louth (with two on 22nd November) and Norfolk, and new arrivals in Caernarfonshire, Devon, Fife, Co. Kerry and Yorkshire (two).

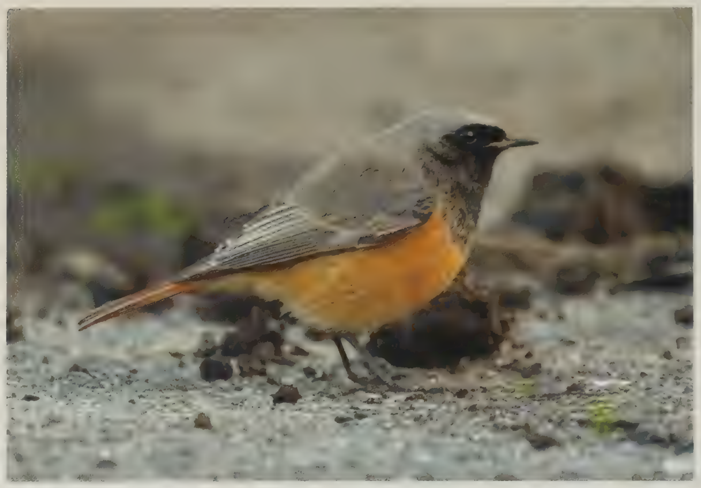
Pacific Diver *Gavia pacifica* Mount's Bay (Cornwall), 22nd November to 6th December; Finvarra Point (Co. Clare), 29th November. **White-billed Diver** *Gavia adamsii* Filey Brigg then Flamborough Head (both Yorkshire), 1st December.

Night Heron *Nycticorax nycticorax* Crosshaven (Co. Cork), 29th November. **Cattle Egret** *Bubulcus ibis* Long-stayers Cheshire & Wirral, Co. Down, Kent (up to three) and Sussex, with new arrivals at Rutland Water (Leicestershire & Rutland) and Willow Tree Fen (Lincolnshire). **Great White Egret** *Ardea alba* A widespread influx, with a peak count of 12 at Dungeness (Kent), 26th November. **Purple Heron** *Ardea purpurea* Capel Gwyn (Anglesey), 18th–25th November. **Black Stork** *Ciconia nigra* St Osyth (Essex), 15th November, same Trimley Marshes, 15th–16th, Hazlewood Marshes (both Suffolk), 17th, Waxham 20th, and Bradwell (both Norfolk), 24th November. **Glossy Ibis** *Plegadis falcinellus* Records from Cambridgeshire, Essex, Kent, Lincolnshire and Co. Waterford.

Black Kite *Milvus migrans* Dublin Airport (Co. Dublin), 16th November. **American Coot** *Fulica americana* Lough Gill (Co. Kerry), long-stayer to 7th December; North Uist (Outer Hebrides), 16th November to 7th December. **Little Bustard** *Tetrax tetrax* West Bexington (Dorset), 18th November.

Spotted Sandpiper *Actitis macularius* Inverallochy (North-east Scotland), long-stayer again 7th December. **Lesser Yellowlegs** *Tringa flavipes* Long-stayers Hayle Estuary (Cornwall) to 2nd December, and Rogerstown (Co. Dublin) to 16th November; Brownsea Island (Dorset), 8th December.

Pomarine Skua *Stercorarius pomarinus* Gibraltar Point (Lincolnshire), 81 (reserve record); Spurn (Yorkshire), 37; Cley (Norfolk), 12, all 2nd December. **Forster's Tern** *Sterna*


Graham Catley

28. Male 'Eastern Black Redstart' *Phoenicurus ochruros phoenicuroides*, Scalby, Yorkshire, December 2014.

forsteri Kinvarra Bay, 23rd November, same Nimmo's Pier, 28th November and Claddagh (all Co. Galway), 30th November. **Bonaparte's Gull** ***Chroicocephalus philadelphia*** Dawlish Warren (Devon), long-stayer intermittently to 7th December; Farne Islands, 23rd November, presumably same Rising Sun CP (both Northumberland), 29th November; Loch Gilp (Argyll), 1st December. **Laughing Gull** ***Larus atricilla*** (Co. Cork), long-stayer to 6th December. **Franklin's Gull** ***Larus pipixcan*** Blashford Lakes, long-stayer to 25th November.

European Roller ***Coracias garrulus*** Drinagh (Co. Cork), 16th November. **Isabelline Shrike** ***Lanius isabellinus*** Pendeen (Cornwall), long-stayer to 16th November; Hengistbury Head (Dorset), 15th–16th November. **Penduline Tit** ***Remiz pendulinus*** Strumpshaw Fen (Norfolk), two long-stayers again 18th–19th November; Ouse Fen (Cambridgeshire), 4th December; Cotswold Water Park (Worcestershire), 6th December; Topsham/Bowling Green Marsh (Devon), two, 5th, three, 7th–9th December.

Hume's Warbler ***Phylloscopus humei*** Bawdsey (Suffolk), 15th–17th November; Loch of Strathbeg (North-east Scotland), 16th November; Whitley Bay (Northumberland), 22nd–24th November; Exeter (Devon), 23rd November. **Dusky Warbler** ***Phylloscopus fuscatus*** Portland (Dorset), 12th–16th November, another 19th–20th November; Hollesley Marshes, 15th–18th November; Landguard, 16th–20th November; Boyton Marshes (all Suffolk), 20th November; Kelynack (Cornwall), 16th November to 9th December; St Mary's, 19th November, Tresco (both Scilly), 23rd–24th November. **Subalpine Warbler** ***Sylvia cantillans*** Carne/Churchtown (Co. Wexford), 11th November.

Rose-coloured Starling ***Pastor roseus*** Long-stayers St Buryan to 12th November, and Penzance (both Cornwall), to 16th November; also Bishopston (Somerset), 13th and 25th November to 5th December. **Grey-cheeked Thrush** ***Catharus minimus*** Rerwick (Shetland), long-stayer to 19th November. **White's Thrush** ***Zoothera dauma*** Lerwick (Shetland), 19th November. **Red-flanked Bluetail** ***Tarsiger cyanurus*** Geosetter (Shetland), long-stayer to 17th November; Westray (Orkney), 19th November. **Black Redstart** ***Phoenicurus ochruros*** There was a widespread influx during November, including 13 at Portland and seven at Dungeness on 18th, and seven on St Mary's on 19th, with **'Eastern Black Redstarts'** ***P. o. phoenicuroides*** at Scalby (Yorkshire), 29th November to 3rd December and St Mary's, 30th November to 9th December. **Siberian Stonechat** ***Saxicola maurus*** Long-stayer Seaview (Isle of Wight), to 14th November; also Cleadon (Co. Durham), 12th–22nd November. **Isabelline Wheatear** ***Oenanthe isabellina*** Seaton Snook (Cleveland), 23rd–27th November. **Desert Wheatear** ***Oenanthe deserti*** Gorleston-on-Sea (Norfolk), long-stayer to 14th November; Montrose (Angus & Dundee), 16th–19th November; Porthgwarra (Cornwall), 26th November to 9th December; Winterton (Norfolk), 5th–7th December; Lizard (Cornwall), 7th December.

Blyth's Pipit ***Anthus godlewskii*** St David's Head (Pembrokeshire), 18th November; Pugney's Country Park (Yorkshire), 8th–9th December. **Olive-backed Pipit** ***Anthus hodgsoni*** Deerness (Orkney), 10th November; Toab (Shetland), 17th November; Fair Isle, 19th November to 2nd December.

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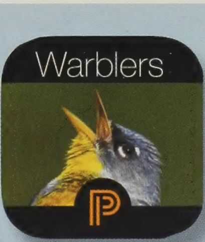

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